

# THE AMERICAN JOURNAL OF PHARMACY

AUGUST, 1896.

## A CONTRIBUTION TO THE KNOWLEDGE OF SOME NORTH AMERICAN CONIFERÆ.

BY EDSON S. BASTIN AND HENRY TRIMBLE.

(Continued from page 386.)

### PICEA ALBA, LINK.

#### CHEMICAL COMPOSITION.

The leaves, stem bark and root bark of a white spruce tree, cut in March, 1896, were subjected separately to a proximate analysis. The following are the percentage results on the moisture, ash and tannin:

	Moisture.	Ash in Absolutely Dry Sample.	Tannin in Absolutely Dry Sample.
Leaves . . . . .	8.26	5.29	7.89
Stem bark . . . . .	8.17	4.11	21.63
Root bark . . . . .	8.72	9.81	19.09

The ash in each was found to contain potassium, calcium and iron, combined with phosphoric, sulphuric and carbonic acids.

The foregoing portions, treated with absolute alcohol, yielded the following percentage results to that menstruum:

Leaves . . . . .	24.99
Stem bark . . . . .	33.25
Root bark . . . . .	33.49

These respective portions, when treated with petroleum ether, yielded the following percentage amounts of the original material, indicating that amount of fat, wax, fixed and volatile oils dissolved by that solvent :

Leaves . . . . .	3.91
Stem bark . . . . .	3.62
Root bark . . . . .	2.81

These figures, deducted from those given for the total amount extracted by absolute alcohol, indicate the amount of resin and tannin.

The residual insoluble portions from the treatment with absolute alcohol were treated separately with water, to which they yielded considerable quantities of glucose and mucilage.

Tannin was separated from the bark of the root and stem separately, and the ultimate analyses of them indicated that they belong to the same class as those already found in this natural order of plants, and to those derived from oak bark. A larger amount was then prepared from the mixed stem and root barks, so as to admit of more thorough purification, and submitted to combustion, when the following percentages were obtained :

Carbon . . . . .	59.99
Hydrogen . . . . .	6.74

The qualitative reactions of this tannin likewise indicated that it belonged to the oak bark group, according to the following :

- Ferric chloride gave green color and ppt.
- Bromine water gave yellow ppt.
- Calcium hydrate gave light ppt., turning brown.

#### ECONOMICS.

The wood of this tree is straight-grained, light yellow in color, soft and light, and not very strong. It is to a considerable extent made into lumber, and is somewhat employed in making spars and masts of vessels. The fibres of the roots are very tough, and, when macerated in water, deprived of their bark, and split, are employed by the Indians of the North in stitching their birch-bark canoes.

#### PICEA NIGRA, LINK.

##### BLACK OR DOUBLE SPRUCE.

#### DISTRIBUTION AND GENERAL CHARACTERS.

This species, from its dark-colored stem and branches, is commonly called the black spruce. It occurs in Labrador, the Hudson

Bay region, about the mouth of the Mackenzie River, throughout Canada, along the eastern slopes of the Rocky Mountains, and in the northeastern portion of the United States. It occurs as far south as Pennsylvania and Central Michigan. It is a moderate-sized tree, attaining a height of not more than about 70 feet, and a diameter of not more than 3 feet. It favors light and rocky soil, and

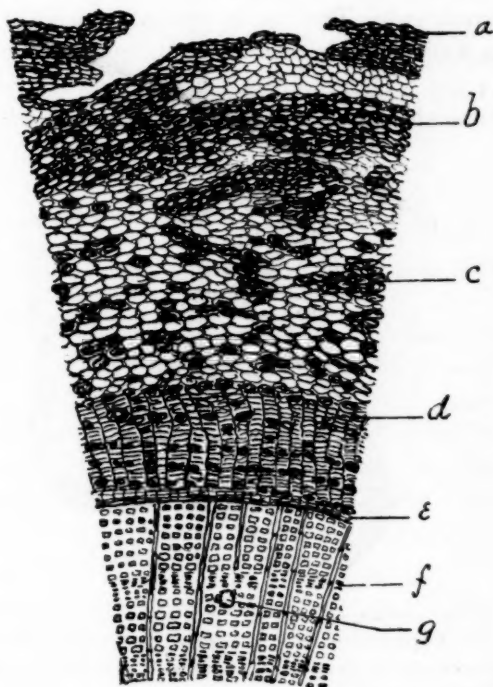


Fig. 40.—Cross-section from stem, several years old, of *Picea nigra*, magnified 75 diameters. *A* and *b*, periderm layers, rich in tannic and coloring matters; *c*, tannin cells in cortex; *d*, bast layer; *e*, cambium zone; *f*, ring of growth; *g*, secretion reservoir in xylem.

hilly or mountainous localities. It is one of the commonest of the evergreens of our northern forests.

This species differs from *P. alba* in having its branches pubescent, its leaves thicker and usually dark green or but slightly glaucous, and its cones ovate, and with denticulate scales. The trunk is smooth, straight, gradually tapering from base to apex. The bark is smooth and the branches horizontal.

## MICROSCOPICAL STRUCTURE.

A twig of several years' growth, from which the epidermis and exterior parts of the primary cortex had disappeared, was studied microscopically. The superficial periderm layers, composed partly of stone cells and partly of thin-walled cells, contained much tannin and coloring matter. The sublying cortical layers contained many tannin and crystal cells, some cells enclosing brown coloring matter, and a few stone cells. The bast layer was destitute of bast fibres, and, like *P. alba*, had its numerous rather large tannin cells arranged in tangential rows. There were a few secretion reservoirs in the bark. The wood was similar in structure to that of *P. alba*, but the secre-

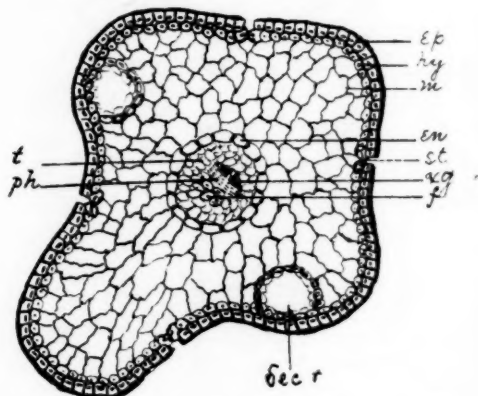


Fig. 41.—Cross-section of leaf of *Picea nigra*, magnified 75 diameters. *Ep*, epidermis; *hy*, hypoderma; *m*, mesophyll; *en*, endodermis; *st*, stoma; *xy*, xylem of fibro-vascular bundle; *f*, fibres at the outer margin of the phloem; *ph*; *t*, transfusion tissues.

tion reservoirs were few and small. Tannin was observed to be present in the medullary ray cells of the wood.

The leaves of this species are from  $\frac{1}{2}$  inch to  $\frac{5}{8}$  inch long, and  $\frac{1}{35}$  inch in diameter, abruptly pointed, usually curved, quadrangular-prismatic, possessing from three to five more or less interrupted rows of stomata on each side. The epidermis was observed to be composed of small, very thick-walled cells, and the hypoderma of one layer of thick-walled cells. The mesophyll was composed of wavy-walled parenchyma, the central bundle was small, distinctly double, and had at the outer border of the phloem a few thick-



walled fibres. The layer of transfusion tissue was moderately thick, the endodermis large-celled, and the radial walls of its cells were thickened. The secretion reservoirs, which were located at the lateral angles, were of moderate size.

#### CHEMICAL COMPOSITION.

Owing to the similarity in most particulars of the white and the black spruces, and the absence of sufficient material at a convenient time, a detailed chemical study was not made of the latter. A sample of bark from a branch, collected in the Adirondack Mountains, New York, in August, 1895, yielded the following percentage results:

Moisture . . . . .	9.95
Ash in absolutely dry bark . . . . .	2.72
Tannin in " " " . . . . .	12.13

The fact that this sample was from a branch, and collected late in the summer, would account for the lower percentage of tannin than that yielded by the white spruce.

There is another constituent of considerable importance in the black spruce, although it has not been studied by us, and that is the resinous exudation, popularly known as *spruce gum*. In 1886 Menges<sup>1</sup> contributed an article of considerable interest on this subject. He showed that it is obtained from the black spruce, although small quantities are yielded by the white spruce. None, however, is obtained from the hemlock spruce, *Tsuga Canadensis*, as is frequently reported.

The spruce gum is not obtained by hacking or puncturing the trees, but exudes spontaneously from decayed knots, or seams caused by extremes of heat and cold. Simply bruising the bark will not cause a flow of the resin, but the cavity must extend through the bark and sapwood.

The so-called gum is collected during the winter season by men on snow-shoes, who are provided with a small tin cup attached to a chisel and long pole, so that, as the mass of resin is cut off, it drops into the cup.

The largest quantities are collected in Maine, New Hampshire, Vermont and Canada.

<sup>1</sup>Examination of the So-called Spruce Gum. Adolph F. Menges. *Contrib. Dep. Phar., University of Wisconsin*, 1886, p. 30, and *AMER. JOUR. PHAR.*, 1886, p. 394.

On distillation with water or steam, the resin of spruce yields a volatile oil, which boils at  $160^{\circ}$  and appears to be composed almost entirely of terpene,  $C_{10}H_{16}$ . The residual resin, after removal of volatile oil, was found by Menges to be soluble in alcohol, methyl alcohol, ether and chloroform, sparingly soluble in benzol and insoluble in petroleum ether; it did not afford crystals of abietic acid when digested with alcohol of 0.890 specific gravity, thus differing from colophony; and when treated with dilute nitric acid it yielded picric acid, whereby it further differed from colophony.

#### ECONOMICS.

The wood of this tree is rather compact, straight-grained, soft and light, usually reddish in color, and, though not very strong, is, by reason of its lightness and elasticity, much used in construction. It is largely used for spars, the knees of vessels, the rafters of houses, railway ties, and for manufacture of lumber. The twigs are also employed for brewing spruce beer, which, in the north-eastern part of the United States and in Canada, is regarded as a wholesome drink.

### PICEA PUNGENS, ENGELMANN.

#### COLORADO BLUE SPRUCE.

#### DISTRIBUTION AND GENERAL CHARACTERS.

The blue spruce is western in its range, being found in the mountains of Colorado, Wyoming and Utah. In favorable situations it becomes a large tree, attaining a height of 150 feet, and a diameter of 3 feet. It does not, like the two species just considered, form large forests, but is rather rare or of local occurrence. The species has a thick, smooth, gray bark, which, on old stems, is fissured. Its branches are horizontally spreading, and its branchlets are smooth and glossy. Its cones are solitary or clustered, cylindrical, drooping, light brown in color, and  $2\frac{1}{2}$  to 5 inches long. The scales are oval, more or less undulate, margined and retuse.

#### MICROSCOPICAL STRUCTURE.

A cross-section of the stem of two years' growth showed the following structure: an epidermis of thick-walled cells, supported by two or three layers of thick-walled hypodermal cells. Beneath this was a thin-walled parenchyma, similar to that described in the other two species. Bounding this on the interior was the periderm layer,

rich in tannin, and containing also crystals of calcium oxalate. The thick layer of parenchyma interior to this contained only a resin passage, numerous scattered resin cells, and some cells containing crystals of calcium oxalate. In the bast layer were tannin cells,

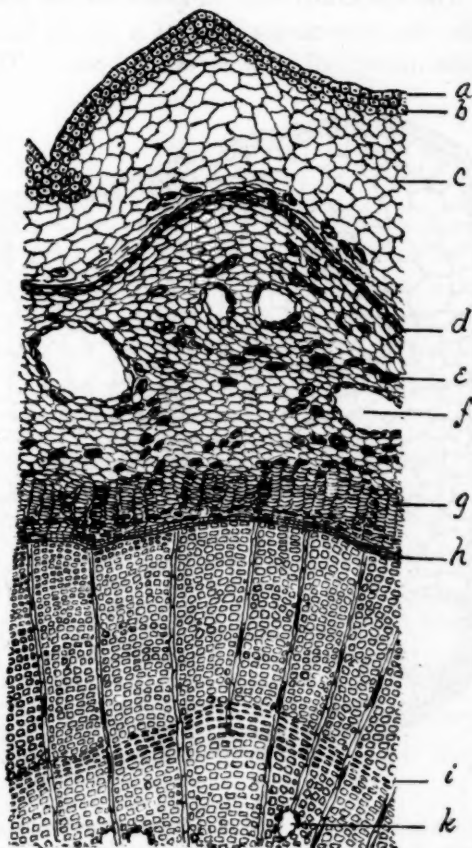


Fig. 42.—Cross-section from stem, two years old, of *Picea pungens*, magnified 75 diameters. *A*, epidermis; *b*, hypodermis; *c*, thin-walled parenchyma, containing but little tannin, except in its inner layer; *d*, periderm layer; *e*, tannin cell in cortex; *f*, secretion reservoir; *g*, bast layer of bark; *h*, cambium zone; *i*, ring of growth; *k*, secretion reservoir in xylem.

arranged as in the other species, in tangential rows. A small amount of tannin was noticed in the medullary ray cells and about the secretion reservoirs in the wood. In other respects the xylem presented no important peculiarities.

A very few stone cells were observed in the bark.

The leaves are sessile, four-sided and four-angled, glaucous, very sharp-pointed,  $\frac{3}{4}$  inch to 1 inch long, and  $\frac{1}{16}$  inch thick. On each face were observed four more or less interrupted rows of stomata. The epidermis was composed of one layer of small, thick-walled cells, the hypoderma also of a single layer of thick-walled cells, and the mesophyll of wavy-walled cells. The secretion reser-

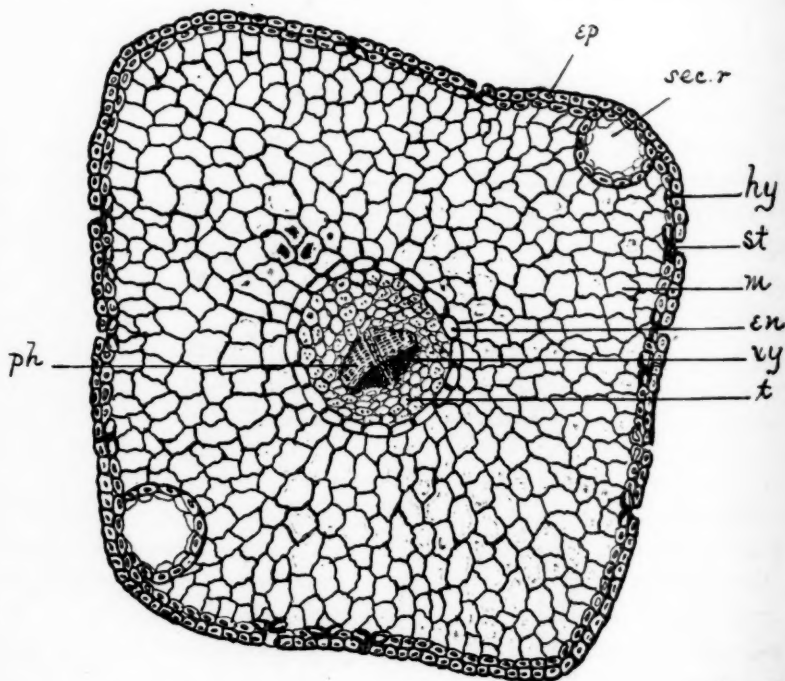


Fig. 43.—Cross-section of leaf of *Picea pungens*, magnified 75 diameters. *Ep*, epidermis; *hy*, hypoderma; *sec. r.*, secretion reservoir; *st*, stoma; *m*, mesophyll; *en*, endodermis; *xy*, xylem; *t*, transfusion tissue; *ph*, phloem.

voirs at the lateral angles were of rather large size. The central fibro-vascular bundle was double, of small size, enveloped by a rather copious transfusion tissue, and this, in turn, was surrounded by distinct, rather large-celled endodermis.

#### CHEMICAL COMPOSITION.

From a good-sized nursery specimen grown in Pennsylvania, we have been able to make some examination of the constituents in

the bark of the stem and roots of this species. The material was collected in June.

The moisture, ash and tannin were first estimated in separate portions, with the following percentage results :

	Moisture.	Ash in Absolutely Dry Bark.	Tannin in Absolutely Dry Bark.
Stem bark . . . . .	10.47	4.21	8.66
Root bark . . . . .	10.65	5.03	17.51

The constituents of the ash in both were found to be potassium and calcium, combined with phosphoric and carbonic acids.

The stem bark yielded to absolute alcohol 17.43 per cent. of oleo-resinous extract, of which an amount representing 3.59 per cent. of the original drug was found to be soluble in petroleum ether, and consisted of volatile oil, resin and wax. The remaining 13.84 per cent. of the alcoholic extract consisted of resin and tannin, from which, by deducting the tannin, we obtained 5.18 per cent. of resin. In the same manner we found in the root bark 26.37 per cent. of total absolute alcohol extract, 3.30 per cent. of volatile oil and wax, and 5.56 per cent. of resin.

The aqueous extraction of the residual bark, after treatment with absolute alcohol, yielded considerable amounts of mucilage and glucose.

A quantity of the tannin was prepared from the root bark, purified and submitted to elementary analysis, with the following percentage results :

Carbon . . . . .	59.44
Hydrogen . . . . .	5.72

These figures, with the behavior towards iron salts and bromine water, indicate that the tannin of the blue spruce belongs to the oak bark group.

#### ECONOMICS.

The wood of this species is very similar in its texture to that of the other spruces already described. Its chief use at the present time, so far as we know, is as an ornamental tree for parks and lawns, for which purpose, on account of its beautiful color and compact habit, it is especially adapted.



## PICEA EXCELSA, LINK.

## NORWAY SPRUCE.

Although not originally a native of the Western Continent, the Norway spruce has become so firmly established in this country as to make its consideration along with our own species of especial interest. It is one of the largest and finest of its genus, attaining a height, in some cases, of 180 feet and a diameter of 6 feet.

It is of conical form; its lower branches are drooping; the bark of the trunk is rather thin, warty, of a reddish-brown color and becoming scaly on old trees. The cones are cylindrical, terminal, pendant; its scales are naked, flattish and truncate at the apex. The cones are large, from 5 to 7 inches long, and from  $1\frac{1}{2}$  to 2 inches thick.

The species is widely distributed over the cooler portions of Europe and Asia. It is common in Scandinavia, Lapland, Denmark, northern Germany, the Alps (where, at an elevation of 4,000 to 6,500 feet, it comprises vast forests), Russia and Siberia.

## MICROSCOPICAL STRUCTURE.

A cross-section of the stem of two years' growth showed the following structure: The thick-walled epidermis was supported by only about one layer of thick-walled fibres. Beneath this were several layers of thin-walled, large-sized parenchyma cells. Interior to this was a layer of periderm, consisting partly of stone cells and partly of thin-walled cells abounding in tannin. Interior to this was a considerable thickness of parenchyma, containing some oleo-resin cells and numerous tannin cells. In this area also occurred occasional crystal cells, similar to those whose occurrence has been noted in other species of *Picea* and *Pinus*. No stone cells were observed interior to the periderm layer. The bast layer was without fibres and contained numerous small tannin cells. The xylem had the usual structure and contained but little tannin.

The leaves of this species are from  $\frac{1}{2}$  to  $\frac{3}{8}$  inch in length and  $\frac{1}{30}$  inch thick, quadrangular, prismatic, pointed, rigid, deep green, and were observed to have from three to five more or less interrupted rows of stomata in each face. The epidermis was composed of small cells, with thick and strongly cutinized exterior walls, and with but moderately thickened inner and radial walls. The hypoderma was, at the angles, two-layered, elsewhere one-layered, and was composed of thick-walled cells. The mesophyll was composed of



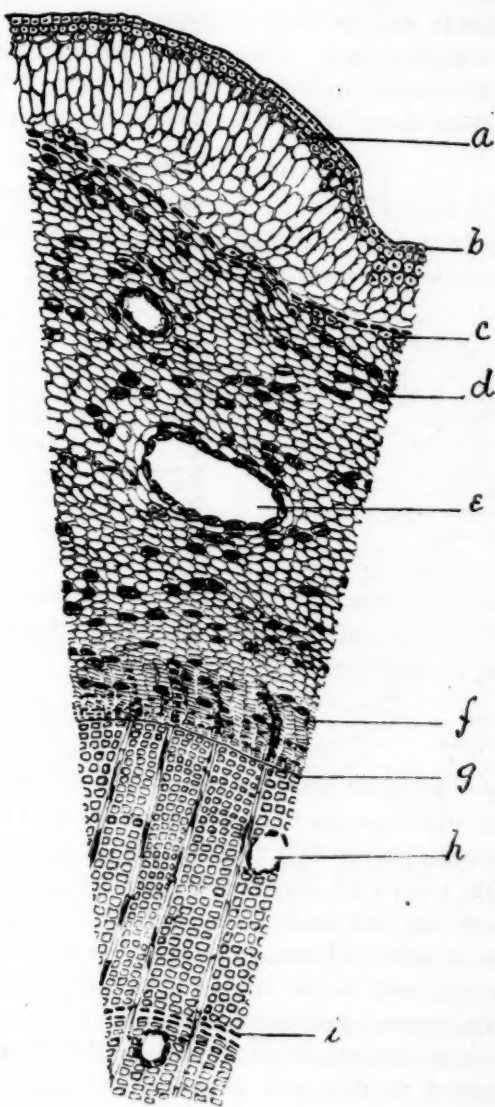


Fig. 44.—Transverse section from stem, two years old, of *Picea excelsa*, magnified 75 diameters. *A*, hypoderma; *b*, epidermis; *c*, periderm layer in formation—its cells rich in tannin; *d*, tannin cell in cortex; *e*, secretion reservoir; *f*, bast layer of bark; *g*, cambium zone; *h*, secretion reservoir in xylem; *i*, ring of growth.

wavy-walled cells, which abounded in tannin. The endodermis was similar to that of the other species described; the transfusion tissue was copious and of the usual character; the fibro-vascular bundle was double, and at the exterior side of the phloem was a mass of thickish-walled and lignified fibres.

#### CHEMICAL COMPOSITION.

The specimen from which the barks of the stem and root were taken was collected near Philadelphia in May. The moisture, ash and tannin were estimated, and the following percentage results obtained:

	Moisture.	Ash in Absolutely Dry Bark.	Tannin in Absolutely Dry Bark.
Stem bark . . . . .	11.37	4.98	15.40
Root bark . . . . .	11.32	6.11	15.39

A quantity of the tannin was prepared from the root bark by means of acetone, and purified. Its elementary analysis yielded the following percentage results:

Carbon . . . . .	60.81
Hydrogen . . . . .	6.00

There is no doubt that this tannin is identical with those obtained from the other species of *Picea*, as well as with that from oak bark. The percentages of hydrogen found in all the spruce tannins are nearly 1 per cent. higher than the average found in most other tannins of the oak bark group, but this is accounted for by the presence of adhering resin, which it is almost impossible to separate entirely, and which contains, in many cases, nearly twice as much hydrogen as exists in the tannin.

The most important constituent of the Norway spruce is the resin, known as Burgundy pitch. The largest proportion of this resin is collected in Finland, smaller quantities are produced in southern Germany and Switzerland. None was ever produced in Burgundy. It is collected by making longitudinal incisions, somewhat after the manner of turpentine. The products consist of resin, volatile oil, similar to oil of turpentine, and water. The resin

is purified by melting and straining through straw. When heated sufficiently long it is deprived of all of its volatile oil and water, and becomes clear and of a brown color. The composition of the resin has not been studied, but it is said to consist largely of abietic acid, and thereby closely resembles the resin of turpentine.

#### ECONOMICS.

The wood of this species is elastic, light, not very strong, and varies in its durability according to the soil in which it grows. The

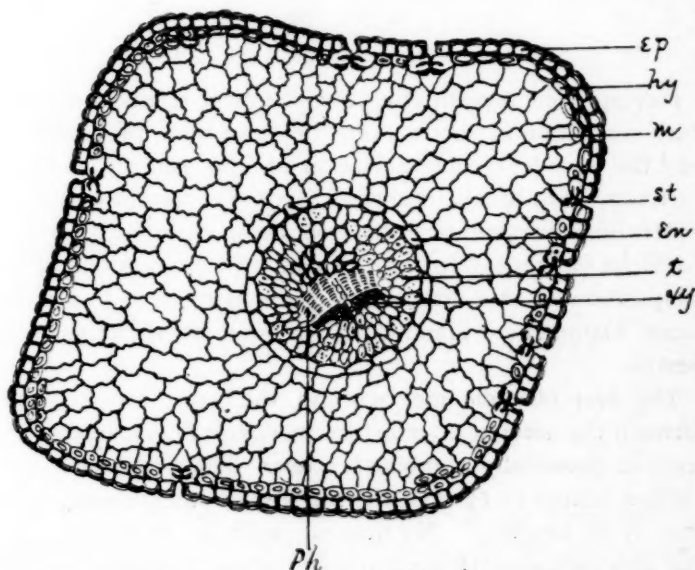


Fig. 15.—Cross-section of leaf of *Picea excelsa*, magnified 75 diameters. *Ep*, epidermis; *hy*, hypodermis; *m*, mesophyll; *st*, stoma; *en*, endodermis; *t*, transfusion tissue; *xy*, xylem of bundle; *ph*, phloem of bundle. This section does not happen to show the secretion reservoirs often found at the lateral angles of the leaf.

bark is employed for tanning. The buds and young shoots are employed, like those of *P. nigra*, for the purpose of brewing a beer. The wood is also extensively used in construction, for ladders, spars, oars, the masts of vessels, and for sawing into lumber which is used for a great variety of purposes.

The wood is fine-grained and takes a high polish, and hence is much employed in the cabinetmaker's art and in the construction of musical instruments.

It is known in England under the name of *white deal*.

In recent times the wood of the Norway spruce has come into extensive use for manufacture into paper. The exports of wood pulp, mostly from this tree, from Norwegian ports—part of which is Swedish produce—amounted, in 1893, to 230,000 tons.

(To be continued.)

## ON THE CHEMICAL COMPOSITION OF BISMUTH SUBNITRATE.

BY LYMAN F. KEBLER.

Having been investigating the chemical composition of the bismuth subnitrate in our markets for some time, the writer naturally read the excellent communication on this subject, by the late Dr. Curtman,<sup>1</sup> with much interest. Since the results obtained by the writer differ, in some respects, from those reported by Dr. Curtman, it will be interesting to record them. For conditions affecting the composition of this article the reader is referred to Dr. Curtman's paper, Dammer's "Handbook," or any other extensive chemical treatise.

The first obstacle met with in the work was to differentiate between the amount of moisture mechanically retained and the per cent. of chemically combined water. The Pharmacopœia states: "When heated to 120° C., the salt loses water (between 3 and 5 per cent. of its weight)." No time is specified. Is it to be understood that this indicates the mechanically retained moisture or both? In order to obtain some data on the subject, the following experiments were made: A weighed quantity of good bismuth subnitrate<sup>2</sup> was placed in a desiccator containing strong sulphuric acid, and the total percentage of loss for the entire time noted every twenty-four hours, with one exception: 1st day 0.87, 2d 0.96, 3d 0.96, 4th 1.19, 5th 1.19, 7th 1.26, 8th 1.30, 9th 1.30, 10th 1.30, 11th 1.31, 12th 1.32.

Next, given weights of ten samples were simultaneously dried in an air bath, at 90° C., for 2, 8 and 24 hours, and the total loss noted at the end of each interval of time. Drying was then continued at

<sup>1</sup> 1896, *Am. Druggist*, 28, 8; *Pharm. Era*, 15, 43; *Pharm. Review*, 14, 12.

<sup>2</sup> No. 9 in tables below.

100° C. for 8 hours. The temperature was now raised to 120° C., and the total loss taken at intervals of 4, 14 and 34 hours, and finally drying was continued at 140° C. for 16 hours. The results were as follows:

Number.	Physical Appearance.	Microscopical Appearance.	Per Cent. of Moisture at 90° C., 2 hours.	Per Cent. of Moisture at 90° C., 8 hours.	Per Cent. of Moisture at 90° C., 24 hours.	Per Cent. of Moisture at 100° C., 16 hours.	Per Cent. of Moisture at 120° C., 4 hours.	Per Cent. of Moisture at 120° C., 14 hours.	Per Cent. of Moisture at 120° C., 34 hours.	Per Cent. of Moisture at 140° C., 16 hours.
1...	Bulky.	Crystalline.	1'04	1'18	1'23	1'26	1'83	2'30	3'25	5'63
2...	"	"	0'70	0'89	0'98	0'98	1'21	1'70	2'23	2'76
3...	"	"	0'61	0'94	1'03	1'08	2'43	2'51	3'19	4'23
4...	"	"	1'08	1'11	1'23	1'33	1'88	3'65	4'01	4'07
5...	{ Moderately heavy.	{ Amorphous and Crystalline. }	0'35	0'83	0'94	0'97	1'15	1'68	2'37	3'39
6...	Bulky.	Crystalline.	0'93	1'12	1'19	1'23	2'55	2'81	3'39	3'63
7...	"	"	0'81	1'09	1'20	1'24	2'13	2'77	3'26	3'57
8...	"	"	1'04	1'16	1'20	1'21	2'73	2'85	3'93	3'93
9...	"	"	0'98	1'19	1'31	1'31	3'03	3'94	3'95	4'04
10...	Heavy.	Amorphous.	0'26	0'80	0'84	0'84	0'84	1'12	2'05	2'35

In general, when drying in a desiccator over sulphuric acid is sufficiently prolonged, all of the mechanically retained moisture is abstracted. The same holds true when a substance is heated for a sufficient length of time at 100° C. From the fact that the amount of moisture obtained by these two procedures agree so closely, we might infer, on the one hand, that it represented all of the moisture mechanically retained, and that a portion of the loss at 120° C. is due to water chemically combined. On the other hand, microscopical examinations show that the crystals, after having been heated at 120° C. for 34 hours, had not suffered any disintegration. The small loss may, however, not affect the structure of the crystals. The above results will not admit of absolute conclusions, consequently the amount of water lost at 120° C. is taken as a basis of future calculations for ready comparisons.

Two sources of information are still left us: (1) the per cent. of

metallic bismuth, and (2) the per cent. of combined nitric acid. These were estimated in the ten samples examined above with the following results:

Number.	Per Cent. of Bismuth Oxide.	Per Cent. of Nitric Acid Radical ( $\text{NO}_3$ ).	Per Cent. of $\text{BiONO}_3$ , $\text{H}_2\text{O}$ . Calculated from $\text{NO}_3$ .
1 . . . . .	83.23	18.78	92.09
2 . . . . .	81.26	18.38	90.14
3 . . . . .	81.46	17.88	87.69
4 . . . . .	83.26	18.44	90.43
5 . . . . .	82.50	14.12	69.25
6 . . . . .	81.00	17.76	87.10
7 . . . . .	81.15	17.70	86.81
8 . . . . .	81.36	18.76	92.00
9 . . . . .	81.02	19.21	94.21
10 . . . . .	83.01	19.68	96.51

The bismuth oxide was determined by ignition in the usual way. Any mixture of bismuth subnitrate and bismuth hydroxide would not vary materially in the percentage of bismuth oxide from the above results, consequently this source of information is of little value as regards the amount of bismuth subnitrate.

Several methods were tried for estimating the combined nitric acid. The necessary apparatus for the absolute or copper oxide method was not at the writer's disposal. Gunning's method, modified for nitrates,<sup>1</sup> gave unsatisfactory results, being non-concordant and low. This was undoubtedly due to a loss of nitric acid, encountered when the sulphuric-salicylic acid mixture was added to the bismuth subnitrate. The odor of nitric acid was pronounced at the mouth of the digestion flask. The method employed by Dr. Curtman did not yield satisfactory results in the writer's hands. The end reaction was difficult to determine, on account of the reflection of the pinkish-colored precipitate, and the results were even lower than those obtained by Gunning's process. The volumetric method giving the writer the most satisfactory results is as follows: Suspend any given weight of the salt in about 10 equivalents of distilled water, in a suitable beaker; add an excess of normal potassium hydroxide and a few drops of phenolphthalein solution; bring the

<sup>1</sup> 1895, "Methods of Analysis, Association of Official Agricultural Chemists," p. 18.



contents of the beaker to a brisk boil, and re-titrate the excess of potassium hydroxide. From the results thus obtained, the percent. of the combined nitric acid radical can readily be calculated. The results recorded above may be a trifle low, since it is well known that bismuth subnitrate is with difficulty completely decomposed with dilute alkaline solutions, even at the boiling point.

The samples were taken from original packages. The U. S. Pharmacopœial requirements were complied with in every respect, except that from an appreciable quantity to a minute trace of chlorides was present in every case, and No. 5 was contaminated with the carbonate.

The above results show that the bismuth subnitrate manufactured in Philadelphia, New York and Brooklyn, although not a theoretical chemical compound, is not so excessively "basic" as those reported on by Dr. Curtman, excepting No. 5.

PHILADELPHIA, PA., July, 1896.

## THE VALUATION OF GRANULAR EFFERVESCENT POTASSIUM BROMIDE WITH CAFFEINE.

BY CHARLES E. ALEXANDER, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 155.

In order to estimate the medicinal constituents of granular effervescent potassium bromide with caffeine, the writer has devised and used the following methods with gratifying results:

One gramme of the preparation is dissolved in about 30 c.c. of water, the solution acidified with nitric acid, warmed, and, while constantly stirred, completely precipitated with silver nitrate test solution. The precipitate of silver bromide may be mixed with silver chloride from soluble chlorides in the original preparation. It is, therefore, collected on balanced filters, washed thoroughly with hot water, and afterwards treated on the filter with a 10 per cent. solution of ammonium carbonate, applied in small quantities and uniformly distributed, to dissolve silver chloride. The precipitate is then washed free of ammonium carbonate with cold water, and dried to constant weight at a temperature not exceeding 130° C. The amount of potassium bromide is then calculated by proportion from the weight of silver bromide found.

If it is desired to estimate the chlorides that may have been present in a sample of the granular salt, the filtrate obtained by treating the precipitate with ammonium carbonate can be acidified with nitric acid, the mixture heated, and any precipitate obtained collected on balanced filters, dried like the silver bromide, and weighed.

To estimate the caffeine, 5 grammes of the salt are placed in a mortar and triturated with 3 c.c. of official solution of ferric chloride; then sufficient sodium bicarbonate is added to make a magma and impart an alkaline reaction (about 3.5 grammes). Twenty c.c. of chloroform are then thoroughly rubbed through the magma with the pestle and decanted into a weighed beaker. Two other portions of chloroform, of 10 c.c. each, are then applied to the magma in succession, and likewise transferred to the same beaker. The united chloroformic washings are then carefully evaporated, or distilled off, and the beaker kept in a boiling water bath until the weight is constant.

According to the National Formulary, granular effervescent potassium bromide with caffeine should contain 11.11 per cent. of potassium bromide and 1.11 per cent. of caffeine; but on investigating three of the prominent preparations, which are now placed on the market by as many manufacturing houses, I found them to vary widely from these amounts. One of the samples was not at all uniform, and required to be powdered before the results of duplicate analyses agreed. This suggested imperfect mixing of the materials before granulating the mass, a fault which may, to some extent, account for the great variation of the salts from standard.

The chlorides present did not exceed in any case the amount of potassium chloride allowed by the Pharmacopœia in potassium bromide.

The loss on drying the salts at 90° C. was but 1.1, 1.2 and 1.0 per cent. of their weight.

The results for the medicinal constituents were the following percentages:

Sample.	Potassium Bromide.	Caffeine.
1 . . . . .	17.43	.22
2 . . . . .	8.74	1.50
3 . . . . .	.608	.36

## SOLUTION OF LEAD SUBACETATE.

BY EDWARD M. POST, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy, No. 156.

This official preparation was introduced into the practice of medicine under the name of *Extractum Saturni*, in 1770, by Thomas Goulard, who was at that time a surgeon-major of the military hospital at Montpellier, France. From the outset the preparation received a prominence which time has served to strengthen, until, at the present time, the article has a universal reputation of favor. Though this solution has been prominent and widely known for so long, the method of its preparation seems to have had but little consideration, if we judge from the few suggestions for improvement of that process. But some of these suggestions are very worthy of attention, and the object of the experimental work herein recorded was to test the claims of the following references:

Hennig suggested, in the *Pharm. Cent. Halle*, for 1869, p. 162, to make the preparation by cold digestion of lead oxide with lead acetate solution for twenty-four hours. Of the same order was the suggestion of M. Nerning, as published in the *Four. de Pharm. et de Chimie*, for 1870, at which time the editor, in a note, stated, with reference to this process, that it had long been adopted in the military hospitals, the following being the proportions of ingredients used: crystallized acetate of lead, 300 parts; litharge, in fine powder, 100 parts; distilled water, 650 parts. Put them into a bottle, shake them from time to time, and, at the expiration of six or eight hours, filter.

In Squire's "Companion to the British Pharmacopœia," sixteenth edition, 1894, we find the note: "Digestion in the cold for a week answers equally well if not better than the half-hour's boiling."

The quantities directed by the British Pharmacopœia are: lead acetate, 250 gm.; lead oxide, 175 gm., and water to make 1,000 gm. The Pharmacopœia of this country orders that 170 gm. of lead acetate be dissolved in 800 gm. of boiling distilled water, and that 100 gm. of finely sifted lead oxide be added, the whole boiled for half an hour, replacing from time to time the water lost by evaporation, and, after cooling, adding sufficient water to bring the weight up to 1,000 gm. The product is finally filtered.

The British directions include constant stirring of the boiling solution, something that every skilled pharmacist would do in following the outlined process of the United States Pharmacopœia.

Now, if the suggestions cited above yield good products, a large part of the time and attention bestowed upon the official process may be saved.

A quantity of lead oxide and acetate sufficient to make a number of samples was procured and tested according to the directions of the United States Pharmacopœia. Both of these substances were found to fulfil all requirements, and were used in making all samples, unless otherwise specified. Distilled water was always employed. It was found, in making the samples by cold digestion, that the best results could be obtained by placing the acetate of lead in a bottle with 700 c.c. of water, dissolving by agitation, adding to this solution the oxide of lead, and agitating the mixture until the bright color, which the oxide at first displayed in the solution, had faded to a light yellow, a change usually effected in five minutes. Sufficient water was then added to bring the weight up to 1,000 gm., and the bottle was then placed on its side, in order to present a larger surface of the oxide to the solvent action of the acetate solution, and allowed to stand for the allotted time. If the precaution to agitate, after the addition of the oxide, was not taken, a cake of that substance formed on the bottom of the bottle and was difficult to dislodge; but after the color of the oxide had faded, no such cake formed.

The official method of estimation, which involves the use of normal sulphuric acid volumetric solution with methyl orange as an indicator, was first tried and afterwards adopted with a modification. The method of the revision of 1880, using normal oxalic acid volumetric solution, was also tried on a few samples; but, on account of the slow settling of the precipitate of lead oxalate, it was abandoned.

All of the solutions used in the estimations were freshly prepared according to official directions. The same proportion of the solution of lead subacetate and of the methyl orange solution was used for each titration, but the indicator was not found to give satisfactory results; for after a reddish coloration appeared in the mixture under examination, from 1 c.c. to 2 c.c. of the volumetric solution could be added before the precipitation of the lead ceased to be

visible. The methyl orange was added, however, to each subsequent sample titrated simply to approximately indicate the end of the reaction, which was determined by allowing the precipitated lead sulphate to settle and adding the volumetric solution drop by drop, until a turbidity was no longer produced in the supernatant liquid. Duplicate titrations were made with each sample and the average taken to calculate the percentage of lead subacetate. The samples made with the British proportions showed the following results:

	Per Cent.
Samples 1, 2 and 3, cold digestion for one day . . . . .	29'0, 29'7, 29'7
Sample 4, cold digestion for one day (common lead acetate) . . . . .	25'5
Sample 5, cold digestion for two days . . . . .	22'9
Samples 6 and 7, cold digestion for one week . . . . .	29'4, 30'4
Sample 8, cold digestion for two and one-half weeks . . . . .	30'7
Samples 9 and 10, half-hour's boiling . . . . .	31'1, 30'1

It will be noticed that, according to the table, sample 5 was weaker than sample 4, which was made in a shorter time. This seeming irregularity came about through the sample having been contained in a bottle having a defective cork for two weeks before it was titrated; thus it had been permitted to absorb carbon dioxide from the air and become thereby deteriorated.

To determine the rapidity of this change, experiments were made on sample 9, which, when freshly prepared, showed 31'1 per cent. of lead subacetate; upon standing for one week uncorked, the sample was found to contain 30'1 per cent., and, after another week's exposure, but 29'6 per cent. was present. The precipitate which formed during the exposure, proved to be a carbonate of lead.

With the proportions of the United States Pharmacopœia the following results were obtained by cold digestion.

	Per Cent.
Samples 11 and 12, one day . . . . .	17'0, 17'6
Sample 13, one day (common acetate) . . . . .	18'3
Sample 14, two days . . . . .	18'3
Sample 15, two days (5 per cent. glycerin) . . . . .	18'2
Sample 16, one week . . . . .	18'4
Sample 17, two weeks . . . . .	19'8
Samples 18 and 19, by half-hour's boiling . . . . .	22'9, 20'5

The results yielded by samples 18 and 19 seem to indicate an improbability of attaining the official standard of 25 per cent. when following the official directions, and the other results show the chances



of reaching that strength by cold digestion of the materials in the official proportions are still less.

With the British proportions, however, we find that cold digestion for one day yields us a preparation stronger than our Pharmacopœia requires. It is, therefore, apparent that, by employing proper proportions, a solution of official strength may be had by one day of cold digestion. And this was proven by using 250 gm. of lead acetate, 147 gm. of lead oxide, and enough water to make 1,000 gm. by the directions already given in this paper. After two days the mixture was filtered and the filtrate found to contain 26.9 per cent. of lead subacetate.

While working on this subject the author decided to examine the strength of the preparation as dispensed by some retail and wholesale druggists. Four samples, obtained from retail druggists and made by them, showed respectively, 22.0, 15.7, 1.2 and 18.3 per cent., and three lots from wholesale dealers contained 25.0, 15.9 and 21.5 per cent. against the official requirement of 25 per cent.

### AN INSTRUCTIVE FLORAL MONSTROSITY.

BY EDSON S. BASTIN.

A member of my class recently placed in my hands a rose which has a peculiar interest. Its sepals, instead of being united at their base into a tube, were all distinct and inserted on the thalamus. They were also longer, as long as they would be if, in an ordinary rose, the whole tubular portion had separated into five parts to its base. They were also somewhat more foliaceous than in the ordinary form of the flower. The petals were of the usual shape and numerous, the stamens and pistils also numerous, as in the ordinary form of the cultivated plant; but what was peculiar was the fact that all these parts were inserted, not on a hollow or tubular receptacle, as in the ordinary flower, but on a convex one.

The monstrosity is probably to be regarded as a case of atavism, and is instructive, not only as pointing to the conclusion that the remote ancestors of the rose had all the floral organs distinct and inserted on a convex receptacle, but also as demonstrating the nature of the lower or tubular portion of the flower. It tends to confirm the usual view held by American botanists that the exterior portion of this organ is adnate calyx, and the inner or lining portion, which bears on its surface the pistils, and on its margin the stamens and petals, is the thalamus or receptacle.



## TO WHAT EXTENT IS A PHARMACIST JUSTIFIED IN PRESCRIBING?<sup>1</sup>

BY D. J. THOMAS.

The pharmacy and medical laws would seemingly clearly answer this question. These legislative acts define the privileges of both pharmacist and physician, and draw the line of demarcation that separates the two professions. They fix the boundaries of jurisdiction, and although these acts are not drawn to suit everyone, they are based upon justice and good common sense. The functions of the pharmacist are to compound and dispense physicians' prescriptions, and when he steps outside the realm of his vocation, he transgresses the law regulating the practice of medicine. The medical law clearly defines the privileges of the physician, and in no part of the act does it extend to pharmacists the right to prescribe. It is an unwritten law, however, that under certain conditions pharmacists may exercise the functions of a physician very much as the wise old grandmother exercises this function when she says that "catnip tea is good for babies." In cases of emergency—pending the arrival of a physician—a pharmacist may, from purely humane or philanthropic motives, prescribe and administer to the wants of a sufferer, and his rights in this instance may never be questioned. He sinks his identity and occupies the position of the good Samaritan.

Why does not the pharmacist possess the right to prescribe? Simply because his knowledge of the physiological action of drugs is meagre and his knowledge to diagnose disease is equally limited. His study and research is not along the same lines as that of the physician. He knows little or nothing of human anatomy, and very little more concerning the action of medicines upon the human system. He knows that acids sear and mucilaginous and oleaginous drugs mollify; but the mysteries of diagnosis place a barrier between him and the intelligent exhibition of the remedies he compounds with so much care, perfection and accuracy. No pharmacist would trust his ability to such degree that he would exercise the functions of a physician to undertake the treatment of his own child afflicted with scarlet fever or any other serious disease. Why, therefore,

---

<sup>1</sup> Read at the meeting of the Pennsylvania Pharmaceutical Association, June 18, 1896.

should he usurp the right to play the role of physicians in cases other than his own flesh and blood? Is it because he has a lower estimate of a human life not bound to him by the ties of relationship? The query is broad, inasmuch as it covers the moral and legal phases of the function of the pharmacist. As pharmacists, we should accord to physicians, without regard to its legal bearing, the privileges embodied in the Medical Act, and this carries with it nearly if not all the weight of the argument, viz.: that pharmacists, *as such*, have no legal right and no qualification to prescribe, excepting, as previously stated, in such cases of emergency as demand immediate attention, and only pending the arrival of a physician; and in no event should he undertake the treatment of diseases, specific or otherwise, because he is neither fitted by education nor by moral or legal right to play the role of physician.

There is a growing tendency on the part of pharmacists to recognize the rights of physicians; especially is this true since the enactment of the medical law. The pharmacists cannot be accused of wilfully trespassing upon the field of medicine prior to the passage of this act. They might be excused on the grounds that their jurisdiction was not clearly understood; but now the law clearly defines the offices of both pharmacist and physician.

It has been said, much to the discredit of the pharmacist, that he boldly and wilfully exercises the function of a physician and defiantly disregards all ethical and legal laws that govern the two professions. However true this may be, it does not merit the condemnation of the medical fraternity upon all pharmacists. No more should we, as pharmacists, condemn the entire medical profession for certain apparent irregularities committed by them, and who bring discredit and disgrace to their ranks. As pharmacists, we should condemn and severely discountenance all transgressions of medical law by members of our profession. It has been intimated, but not fully authenticated, that in some instances pharmacists transgress the medical law to such an extent that they make gynæcological examinations, treat obstinate diseases of the eye, ear, nose, throat, urethra, and a score of other serious diseases that demand the attention of skilled physicians. These, however, are isolated cases, and very properly should have our condemnation.

In justice to the physician, and for the promoting of a more harmonious feeling between pharmacist and physician, the former

should confine his attention to his own field of labor and not indulge in excursions into the field of the latter. The successful shoemaker sticks to his last, and it naturally follows that the pharmacist should stick to his pestle and mortar. Much of the criticism heaped upon the entire pharmaceutical profession is due to the reckless disregard of the rights of physicians by a few selfish and mercenary pharmacists. We cannot too strongly condemn this self-sufficiency, and, as members of the Pennsylvania Pharmaceutical Association, let us record our condemnation of such practice.

By closely observing the rights accorded to the physician under the act regulating the practice of medicine, much of the bitter feeling now existing between pharmacists and physicians will be dissipated and ultimately become a matter of history, and result in a warmer and more harmonious feeling between the two professions. Much criticism is placed upon physicians for their action in the matter of dispensing their own medicines. They defend their action by claiming that they have been forced into it by a custom established by the homœopathists, who universally dispense their own medicines. Some physicians claim they have been obliged to do so by the pharmacist who "counter-prescribes." This is one of the parasitic evils that cling to our profession.

Let us meet the physician more than half way, and, by denouncing all transgressions of the latter's rights, we will eventually establish ourselves in the admiration of the medical fraternity, and give to pharmacy a higher position in their estimation.

---

## THE SALE OF ALCOHOLIC LIQUORS UNDER THE HIGH LICENSE LAW IN PENNSYLVANIA.<sup>1</sup>

BY J. A. MILLER.

One of the effects of the passage of the high license law was to stop, very largely, the dispensing of alcoholic liquors in small quantities, in the drug stores throughout the State. It was always a great convenience for families that did not care to keep a supply of liquor in the house, to get what they wanted from time to time from the

---

<sup>1</sup> Read at the meeting of the Pennsylvania Pharmaceutical Association, June 18, 1896, in answer to query No. 4, as follows: "The high license law forbids the sale of alcoholic liquors, except upon a physician's prescription. Is the law a wise one, and is it generally lived up to?"

neighboring drug store. These purchases were mostly made for medicinal, culinary or other legitimate uses. Often, however, this was not the case. Liquor was sold in many drug stores, indiscriminately, to all who asked for it, and without regard to the purpose for which it was wanted. But the high license law put a stop to this business. Alcoholic stimulants are not now so readily purchased, and the people are put to considerable inconvenience to get them.

The law took away a profitable part of the trade of the druggist, and any law, in these days, when profits are so small, that diminishes the volume of trade by taking away the most profitable portion of it, can hardly be regarded by the dealer as a just one. On the other hand, such evil consequences follow the use of alcoholic liquors that this law, which largely restricts their sale, should be regarded as a very acceptable one. Even when care was exercised in their sale it was not easy always to tell the purpose for which the stimulants were wanted. It was hard to turn away a good customer, and in doing so great offence was sometimes given. The refusal to sell on one occasion, in the writer's experience, a bottle of whiskey to a customer, occasioned the loss of his entire trade.

Several years ago, and since the passage of the high license law, we spent a Sunday in one of the western towns of this State, where there were no licensed saloons. From the train that brought us to this place on Saturday evening were unloaded a number of kegs of beer. We were told that this was a daily occurrence; that beer and other alcoholic drinks were brought in and distributed among the club-rooms and other places; and that the seven drug stores in the town were doing a large business in the sale of these stimulants by filling physician's prescriptions.

There was probably no violation of the law here. The state of affairs can be readily understood. The druggists were the only dealers in spirituous liquors, and were reaping a profit from the sale of articles for which there was a constant demand.

The demand for alcoholic liquors is everywhere. Every one of us has been besought to sell them in violation of the State law, and the charge of committing this offence has been frequently spoken against us. So far as we are concerned, we have carefully observed the law. Others whom we know have done the same. We have written a number of letters to members of this Association residing in different sections of the State upon this subject, and have received

one uniform reply to them all—that everywhere they are complying with the terms of the law.

Two cases of violation of the high license law that have come to our knowledge were in the town of Butler. One druggist, an old offender, who was arrested about a year ago, plead guilty and was sent to jail for eight months, and required to pay a fine of \$2,500. The other one was a dentist, who purchased a store about two years ago. He was not registered, and was without any practical knowledge of the business. The store was run by a registered pharmacist. He was tried last fall for violation of the high license law, found guilty, sentenced to jail for seven months, and required to pay a fine of \$1,500. This case has been appealed to the Superior Court on the ground that the owner was not responsible for violations of the law by his clerk.

The result of the inquiries we have made confirms the belief, so frequently expressed in the meetings of this Association, that the high license law is observed by all its members, and that alcoholic liquors are only sold on the prescriptions of physicians. Those who violate the law are mostly ignorant and disreputable persons, who have no qualifications for the business, and who are willing to earn a living by the sale of such articles as minister to the baser appetites and desires of their customers.

---

## THE POPPY AND OPIUM IN PERSIA.<sup>1</sup>

BY ALEXANDER McDONALD.

I have the honor to transmit herewith a report upon the cultivation of the poppy and the preparation of opium in Persia. This report has been prepared to meet some inquiries from the Southern States, and is submitted with a view to its publication in Consular Reports, so that the information contained therein may be at the service of those who are interested in the cultivation of the poppy, and in the preparation of opium for medicinal purposes.

Opium is largely cultivated in Persia. About 6,000 chests, weighing each about 130 pounds, are exported annually, and it is probable that nearly, if not quite, an equal quantity is consumed in the country.

---

<sup>1</sup> Consular Reports, Vol. 51, 83.



The opium poppy (*Papaver somniferum*) is by no means difficult to cultivate; but to bring it to a state of maturity to produce opium requires very considerable knowledge and unremitting care and attention. Indeed, it seems almost impossible without a thorough knowledge of the state of the plant at its various stages, and an unmistakable forecast of the weather, especially toward the time when the juice has to be collected, to even partially succeed.

All Persian opium is cultivated on irrigated land; consequently, the moisture is practically under the farmer's control. This is most important, as rain, when the plant is nearly at maturity, would be certain to destroy the opium elements. The quantity of moisture has to be most carefully regulated, except in the winter, when the plant is in a kind of quiescent state and independent of external influences.

The great difficulty which meets the amateur grower is to know the exact time when the plant arrives at maturity; for without this knowledge all his efforts will be frustrated and his outlay dissipated. All the plants on a plot will not mature at the same time, but each one has to be examined separately. If the incision for extracting the opium is made too early in the plant, nothing but a white sap will exude, and if too late, the juice will have dried up.

The following instructions, except when interfered with by climatic influences, should be carefully observed:

(1) Land intended for the opium crop should be plowed up in July, in order to free it as much as possible from weeds before sowing the seed.

(2) On irrigated lands (which are the best adapted for this crop), the whole surface must be laid out in terraces, larger or smaller as the land is flat or hilly, and each one must be surrounded by a small bank, say 6 inches high, so as to preserve a smooth and level surface, in order that the water may be turned on to an even depth. I have great doubts whether rain-watered land could be depended upon for the regular supply of moisture.

(3) The seed is sown broadcast, in September and October, on a level surface, and not on ridges. Previous to the sowing, the ground is cleared of stones and rubbish, as the plant can be easily obstructed in its growth.

(4) When the seed is sown the water is turned on, and the ground is allowed to remain without any further operation for two or three



days, until the water has become absorbed and the outer surface has had time to dry a little. The ground is then raked over, so as to make a complete covering for the seed. If there should be no rainfall within a fortnight, the water is again turned on, and this is repeated at irregular intervals until the winter rains render it unnecessary. After the sowing and before the next watering, most cultivators sprinkle manure all over the terraces. Almost any kind impregnated with strong alkalis will do.

(5) In about six weeks from the time of sowing, the plants will have shot forth four or five leaves. It may, however, be two months, for the weather is occasionally cool, and this retards growth. They should then be thinned out, so as to stand about 6 inches apart in all directions.

(6) The plants are hardy and will stand the cold up to freezing point. During the winter no irrigation is needed; but here, from the end of March, the plants will have become vigorous and should have water, either by rain or irrigation at the least, every ten days, or, if the weather is hot, every six or seven days. Again, about this time or a little later, manure is spread between the plants in order to keep them strong and stimulate the sap. It is, of course, necessary when the spring growth begins, to observe carefully the state of the plant and not give it too much water, or it will grow out of all proportion, and be utterly useless. The flowers will appear in May, and will continue for about a fortnight. After the flowers begin to droop, and until the opium matures, is the most critical time, and a close observation of the plant has to be made so that a healthy condition may be maintained. A slight watering may be necessary, but the state of the plant must be the determining factor. For some few days before the plant matures no water should be given, and, if possible, not allowed.

(7) When the flower has fallen, the boll immediately below must be very carefully noted. When it assumes a light brown color, darker than amber, it may be assumed that the poppy has matured. An incision, diagonally across the boll from top to bottom, should be made, and if the juice, of a dark brown color, exudes, it is certain that the opium is matured. The incision should be made in the evening, and the opium which adheres to the stem of the plant should be removed before sunrise in the morning. In this country the opium is collected into jars or ordinary cooking utensils, and

stored up at the cultivator's house until the harvest is finished. It must be carefully borne in mind that each plant must be examined before the incision is made, for, as stated above, there is a difference in time in the maturing of the plants—some earlier and some later. The plant ripens—if that expression may be permitted—about the end of May or beginning of June; but the time depends upon a variety of circumstances, although the variations are not great.

(8) The approximate number of plants per acre may be estimated from the distances they are apart, as given above. The Persians have no surface measurement equal to our acre, and seasons and crops vary so much that the average yield cannot be easily estimated. In view of the heavy dues and taxes paid by the cultivators of the poppy, the risk they have to run from climatic considerations, and the fluctuations in the price of opium in the foreign markets, the profits are not much greater than from the ordinary cereals.

(9) The preparation of the drug for the market is usually undertaken by the merchant, and but rarely by the cultivators. This is a business quite distinct, and requires a building and utensils generally beyond the reach of the producer. When the opium reaches the merchant it contains a good deal of foreign matter, especially pieces of the stem of the plant, to which the opium adheres. These have to be removed, and then the opium undergoes a process of kneading and pressing, so as to get rid of the superfluous water. A little linseed oil is used in the process, and some kinds are largely diluted with it. The process of preparing for the consumer requires special knowledge, which is not communicated to everyone, and the value in China largely depends on its manipulation.

It would appear that if the cultivation of opium were taken in hand seriously, two skilled persons—one, the cultivator, and the other, a kneader—should be engaged to undertake the growing and the preparation for the market. Without these, I am afraid, the enterprise would be a failure.

The climatic conditions of the Gulf States, I should say, would be favorable.

---

Barium has been found in hydrobromic acid to a dangerous extent by R. C. Cowley (*Phar. Jour.*, May 16, 1896). When precipitated as sulphate, the quantity present was found to correspond to 4.598 grains of barium in the pint. This impurity may account for the insoluble white precipitates that are obtained when hydrobromic acid is added to quinine sulphate.

IDENTIFICATION AND SEPARATION OF THE PRINCIPAL  
ACIDS CONTAINED IN PLANTS.<sup>1</sup>

BY L. LINDOT.

The reactions which enable us to distinguish the vegetable acids are not numerous and often uncertain in their application; and if we can characterize tartaric acid—thanks to the insolubility of its potassium salt in the mixture of alcohol and ether—we are more embarrassed if it is requisite to isolate the other acids, and especially the citric and malic, so frequently present in vegetable tissues.

When studying the compounds of these acids with quinine and cinchonine, I have found that the resulting salts, and especially the acid salts, present differences of solubility in methylic alcohol, such that it is easy to distinguish citric and malic acids and to separate them from vegetable juices.

(1) Cold methylic alcohol, at 95° Gay-Lussac, dissolves only 0.3 per cent. of acid quinine citrate; so that if we add quinine to a methylic solution of citric acid, at 2 or 2.5 per cent., this alkaloid is dissolved at first, giving then rise, on stirring, to a bulky crystalline precipitate of acid citrate, which may extend to 9.3 per cent. of the theoretical quantity. An excess of quinine, with reference to the composition of the acid salt, redissolves the precipitate and then ultimately the neutral citrate crystallizes; its solubility is greater than that of the acid citrate, and rises to 3.3 per cent.

Under identical conditions the acid quinine malate (solubility in cold methylic alcohol at 95° Gay-Lussac, 8.2 per cent.) and the neutral malate (solubility 8.0 per cent.) remain in solution. The presence of malic acid slightly interferes with the precipitation of acid quinine citrate, and when in a mixture of the two acids the quantity of malic acid represents 25, 50, 100 or 200 per cent. of the quantity of citric acid, the weight of the acid quinine citrate obtained is not more than 99, 97, 94 or 89 per cent. of the citrate which would be obtained in a liquid free from malic acid.

Under the same conditions the acid quinine oxalate (solubility 9.2 per cent.) and the neutral oxalate (solubility 8.2 per cent.) remain equally in solution; but the oxalic acid increases the solubility of quinine citrate in larger proportions than does malic acid.

<sup>1</sup> *Chemical News*, June 26, 1896, from *Comptes Rendus*, 122, 1185.

The precipitate of quinine citrate may be confounded with the quinine acid tartrate (solubility 2.4 per cent.) and the acid succinate (solubility 1.2 per cent.).

(2) Cinchonine dissolved in methylic alcohol precipitates malic acid under conditions identical to those in which quinine precipitates citric acid. However, the solubility of acid cinchonine oxalate in methylic alcohol, at 95° Gay-Lussac and in the cold, which is 2.5 per cent., is higher than that of quinine citrate; but the other salts of cinchonine are so soluble that the precipitation above mentioned may be considered as characteristic of malic acid. Acid cinchonine tartrate is, in fact, soluble at 20.6 per cent.; the acid citrate, the acid oxalate and the acid succinate do not crystallize until their solutions have been brought to the state of syrup. The tartaric, citric, oxalic and succinic acids, if mixed with malic acid, increase in a striking manner the solubility of cinchonine malate in methylic alcohol; it is thus that citric acid, added to malic acid in the proportions of 20, 50, 100 per cent., hinders the tenth, the half and even the whole of the oxalic acid from crystallizing as a cinchonine salt.

(3) To apply the foregoing reactions to the extraction of the acids of a vegetable juice, it must first be evaporated in vacuum and redissolved in methylic alcohol as concentrated as possible. If the juice contains potassium bitartrate and free tartaric acid, it must be treated with alcohol and ether to separate the tartar, and precipitate the tartaric acid in the state of bitartrate by a limited addition of potassa to the same ethero-alcoholic liquor. To eliminate the excess of potassa, we precipitate all the acids by basic lead acetate, and liberate them again with hydrogen sulphide. It is proper to operate in the same manner if the juices contain an excessive quantity of sugars or foreign matters.

The concentrated acids being dissolved in methylic alcohol, we take a known volume of the liquid, which we dilute with methylic alcohol, so that the solution may contain 2.5 per cent. of acid, and we add to the liquid increasing quantities of quinine in powder, until, after being stirred for some time, it sets into a crystalline mass. The quantity of quinine added should not exceed 160 to 170 parts to 100 parts of the citric acid supposed to be present. We must, in fact, avoid adding an excess of quinine, which would dissolve—momentarily at least—the acid citrate and form neutral citrate,

which is more soluble. When the proportion of quinine which must be added has thus been determined, we treat the residue of the liquid with the calculated quantity of quinine. After settling for twenty-four hours, we filter and recommence the same operation upon the mother liquor.

If the liquid does not precipitate under these conditions—that is to say, if it contains no citric acid—we search for malic acid, by adding in one part of the methylic liquid, as concentrated as possible, increasing quantities of cinchonine, the maximum dose of which may be fixed at 140 to 150 per cent. of the estimated quantity of malic acid.

If the two acids are simultaneously present, when the liquid is no longer precipitated by quinine we add cinchonine, the action of which is not interfered with by the excess of quinine.

It is easy to recover the corresponding acids from the salts of quinine and cinchonine obtained. It is sufficient to add to the aqueous solution of these salts ammonia, to filter off the alkaloids, to precipitate the liquid with basic lead acetate, and then decompose the precipitate with hydrogen sulphide; or we may render both the acid and the base insoluble by means of baryta, exhaust the dried precipitate with alcohol, and decompose the barium salt with sulphuric acid.

By these methods I have been able to extract the citric acid contained in lemons and gooseberries, and extract the malic acid contained in cherries.

---

## RUMEX NEPALENSIS, WALL.<sup>1</sup>

BY O. HESSE.

In Madras and other parts of India grows abundantly a species of rumex, *Rumex nepalensis*, Wall., which, on account of its astringent properties, is well known to the natives, who likewise apply it in medicine and for dyeing.

Mr. D. Hooper, quinologist to the Government of Madras, examined the root of this plant, and was of the opinion that it contained chrysophanic acid. But when Hesse pointed out that this substance differed from the chrysophanic acid of *Parmelia parietina*, Hooper wished his investigation repeated by Hesse, and sent him

---

<sup>1</sup> *Liebig's Annalen der Chemie*, 291, 305, and *Pharmaceutical Journal*, (4) 2, 441.



for this purpose a quantity of the root. The results of this investigation were to the effect that this root contained no chrysophanic acid, but a substance similar to it, for which Hesse proposed the name *rumicin*, with reference to its origin, and the names *nepalin* and *nepodin* for two other bodies which accompanied it. Of these bodies, nepalin was found to be the principal constituent of the root in question, the others occurring only in small quantities.

For the isolation of these principles the powdered root was extracted with ether by means of a reflux condenser. From the resulting solution separated yellow-brown crummy crystalline masses. These were collected and the filtrate reduced to about half its original volume by distillation, whereupon more crystalline masses were deposited, and were added to those first obtained.

The remaining solution, on slowly evaporating, yielded another crystallization, which, after washing with a little alcohol, was united with the other crystals. These were then treated with an aqueous solution of potassium carbonate, the solution filtered with as little access of air as possible to the filtrate, an excess of hydrochloric acid added, and subsequently shaken with ether. After distillation of the ether extract, nepodin remained mixed with an amorphous substance. That portion undissolved by potassium carbonate was boiled with acetone, which treatment dissolved out the rumicin from the nepalin, which was the chief constituent of the remaining residue.

*Rumicin*.—From the acetone solution there separated, on cooling, greenish brown crystals. These were separated from the mother liquor, washed with a little acetone, and, when completely dry, dissolved in hot benzene. Three or four times its volume of petroleum ether was added to this solution, the mixture boiled a short time and filtered, whereby a brown, flocculent body was removed. After cooling the filtrate beautiful crystals separated, which, on recrystallization from benzene and petroleum ether, were obtained perfectly pure. Rumicin was found to have the same composition as chrysophanic acid, namely the formula  $C_{15}H_{10}O_4$ .

	Calculated.	Found.
Carbon . . . . .	70.86	70.83
Hydrogen . . . . .	3.94	4.06

It formed laminar crystals of a metallic lustre, which appeared not quite so intense a golden-yellow as chrysophanic acid, and dis-

solved readily in hot alcohol, acetone or glacial acetic acid, readily also in chloroform, but scarcely at all in petroleum ether. The melting point was from 186° to 188°.

To potassium hydrate solution it imparted a purple-red color, which, on exposure to the air, gradually faded. To an aqueous solution of potassium carbonate it gave a very light rose color. Heated with alcoholic potash solution, magnificent purple-colored prisms were deposited, which, on exposure, quickly became yellow. On heating with hydriodic acid, no alkyl iodide was developed, but on the other hand a body perfectly identical with chrysophanhydanthron produced from chrysophanic acid under the same condition.

The only essential difference, therefore, between rumicin and chrysophanic acid was that of their melting points. The hypothesis of their being physical isomers was not confirmed after numerous experiments to convert these bodies one into the other.

*Nepalin.*—The crude nepalin, obtained as previously described, dissolved by gently boiling with benzene. To this solution three or four times its volume of petroleum ether was added and the liquid boiled a short time. A dark brown flocculent body separated, which was easily removed by filtration. From the filtrate was obtained a copious crystallization of nepalin, which was further purified by recrystallization from boiling glacial acetic acid.

This substance formed orange-colored microscopic needles, which melted at 136° to a red liquid. It was not volatile, but at a high temperature was completely decomposed. It contained no water of crystallization, and at 100° showed no loss. Its composition corresponded to the formula  $C_{17}H_{14}O_4$ .

	Calculated.	Found.
Carbon . . . . .	72.34	72.11
Hydrogen . . . . .	4.96	5.01

It dissolved readily in hot glacial acetic acid, readily also in benzene and chloroform, well in alcohol, acetone and ether, colored petroleum ether yellow, but was only very slightly affected by this solvent; with potassium hydrate it gave a purple-colored solution, which, on exposure to the air, was nearly completely decolorized by absorption of  $CO_2$ , whereby nepalin separated as a yellow crystalline precipitate. In an aqueous solution of potassium or sodium carbonate it was nearly insoluble, very slightly soluble in ammonia, to which it gave a red color, and on the addition of barium chloride

and lead acetate to the solution, a dirty-colored, flocculent precipitate was formed. Concentrated sulphuric acid dissolved it with a red color, and on adding some water to the solution, nepalin separated unaltered in yellow flocks. No alkyl iodide was developed on heating it with hydriodic acid, according to Zeisel's method, but it changed to a brown resin, which decomposed on exposure to the air.

*Diacetylnepalin.*—By treatment with acetic anhydride, nepalin exchanged hydrogen for acetyl. The acetic anhydride and nepalin were heated together in a closed tube at a temperature of  $140^{\circ}$ – $150^{\circ}$ , and, in order to complete the reaction, maintained at this temperature for one hour. The solution was poured from the tube while yet warm, whereupon the acetyl derivative immediately crystallized, and, after separation from the mother liquor, was recrystallized successively from hot alcohol and gently boiling glacial acetic acid. This substance formed brownish-yellow, brilliant crystals, which melted at  $181^{\circ}$  to a black liquid.

	Calculated for $C_{17}H_{12}(C_2H_3O)_2O_4$	Found.	
		I.	II.
Carbon . . . . .	68.85	68.73	68.82
Hydrogen . . . . .	4.92	5.10	5.30

*Nepodin.*—Nepodin was also purified with benzene and petroleum ether, as described under nepalin. The hot solution was allowed to cool whereupon the nepodin crystallized in long, greenish-yellow prisms, which were quite brittle. It melted at  $158^{\circ}$ , decomposed at a higher temperature, at  $100^{\circ}$  showed no loss and contained no water of crystallization.

Its composition indicated the formula  $C_{18}H_{16}O_4$ .

	Calculated.	Found.
Carbon . . . . .	72.97	72.94
Hydrogen . . . . .	5.41	5.79

Nepodin dissolved in alcohol, acetone, ether, chloroform and glacial acetic acid with tolerable readiness, and crystallized from these liquids in prisms. In benzene it dissolved very readily; and when to this solution was added petroleum ether or ligroin fine crystals were produced. In alcoholic solution it did not give an acid reaction. It quickly dissolved in an aqueous solution of potassium or sodium carbonate with a yellow-brown color, but which rapidly became darker. In potassium hydrate solution it also dis-

solved quickly with the same color, and in concentrated sulphuric acid with an intense yellow-red color. On the addition of some water to the latter solution, the substance separated, unaltered, in yellow flocks. When barium chloride and lead acetate were added to its ammonia solution, a grayish-yellow amorphous deposit was formed. Heated with hydriodic acid according to the method of Zeisel, it developed no alkyl iodide, but was left as a black-brown resin.

*Diacetylnepodin*.—When treated with a surplus of acetic anhydride for six hours at a temperature of  $85^{\circ}$ , a crystalline derivative was formed. This compound crystallized in large, tabular, pale yellow rhomboids. It contained no water of crystallization, and melted at  $198^{\circ}$ , with decomposition. Its formula was considered to be  $C_{18}H_{14}(C_2H_3O)_2O_4$ .

These results show that *Rumex nepalensis*, Wall., contains a series of substances totally different from those found in the allied group of *Rheum*, of which rhubarb is a member. The latter drug contains chrysophanic acid,  $C_{15}H_{10}O_4$ , emodin,  $C_{15}H_{10}O_5$ , and rhein  $C_{15}H_{10}O_6$ , these substances differing in their proportion of oxygen, while the principles found in *Rumex nepalensis*, Wall., seem to form a homologous series, the members of which differ by  $CH_2$ . There is not sufficient proof to establish the identity of chrysophanic acid and the rumicin obtained from the other members of the *Rumex* group, but their uniformity of behavior, when treated with hydriodic acid, is a subject on which further enlightenment is required.

## JABORANDI AND ITS ALKALOIDS.<sup>1</sup>

BY DR. B. H. PAUL AND A. J. COWNLEY.

Although *jaborandi* is defined in the British Pharmacopœia as the dried leaflets of *Pilocarpus pennatifolius*, it is certain that the drug met with in commerce, under the name of *jaborandi*, is frequently, in part, the produce of other species of *Pilocarpus* and, in some instances, even of plants belonging to another genus. As to the nature of the basic constituents of these different drugs, but little is known, and the discrepancies in the descriptions given of pilocarpine are very suggestive of doubt whether the alkaloid referred to

<sup>1</sup> *Pharm. Jour.* (4), 3, 1 (July 4, 1896).

is always the same substance. This uncertainty is very evident from the account given of pilocarpine in Husemann's "Pflanzenstoffe," as being "difficultly crystallizable," and from the statements in Watts' "Dictionary of Chemistry" and Thorpe's Dictionary that it is "crystalline;" while in other places the alkaloid is described as a syrupy liquid, very soluble in water.

The characters and tests given in the British Pharmacopœia and other pharmacopœias are not sufficiently distinctive for the identification of pilocarpine, and they furnish no proof of absence of other bases capable of forming crystallizable salts with nitric or hydrochloric acid. In the examination of several kinds of jaborandi leaves described by Mr. Holmes, in his papers on the botanical part of the subject,<sup>1</sup> we have endeavored to test the individuality of the basic products extracted by the melting points of the nitrate, and have in that way obtained evidence of differences which appear to point to the desirability of more minute investigation than we have yet been able to carry out, on account of the small quantity of material at our disposal. In testing samples of commercial pilocarpine nitrate obtained from Mr. Martindale, similar differences of melting point have been observed; in one instance the salt melted at 141.7° C., another sample was found to melt at 167.2° C., while a third, supplied by Mr. Gerrard, melted at 150.5° C.

A sample of the small-leaved jaborandi, described by Mr. Holmes as maranham, and named by Dr. Stapf, *Pilocarpus microphyllus*, yielded 0.84 per cent. of alkaloid, which was converted into nitrate, and gave 0.45 per cent. of a crystalline salt melting at 160° C. A solution containing 2 grains in the fluid ounce, when applied to the eye, produced contraction of the pupil. On recrystallization from alcohol the salt was separated into two portions, the larger portion melting at 162.7° C., while the other melted at 147.7° C.

From the leaves described by Mr. Holmes as *Aracati jaborandi*, *Pilocarpus spicatus*, we obtain only 0.16 per cent. of alkaloid. This gave two crystalline nitrates, melting respectively at 151.5° and 130.5° C., an amorphous nitrate, the base of which was soluble in water; also, an amorphous alkaloid insoluble in water, corresponding to the description of jaborine, by Harnack and Meyer. Obviously these leaves are of little value as a source of pilocarpine.

<sup>1</sup> *Pharm. Jour.* (4), 1, 520.



The leaves of *Ceara jaborandi*, *Pilocarpus trachylophus*, yielded 0.4 per cent. of alkaloid, but only 0.02 per cent. of crystallizable nitrate.

From the leaves of *Pilocarpus jaborandi* we obtained 0.72 per cent. of alkaloid, yielding 0.67 per cent. crystallizable nitrate, with a melting point of 161° C.; it was separable on recrystallization into nearly equal portions, melting respectively at 162.67° and 158.3° C.

A sample of reputed *jaborandi* leaves was found, on examination, to contain :

Leaves of <i>Pilocarpus jaborandi</i> . . . . .	12
Leaves of <i>Pilocarpus trachylophus</i> . . . . .	38
Stalks . . . . .	50
	<hr/> 100

On analysis, it yielded 0.13 per cent. of alkaloid, rather more than half of it being convertible into crystalline nitrate that was separated by recrystallization into portions melting at 157.7° and 147.7° C.

The following table gives a concise statement of our results :

	Total Alkaloid. Per Cent.	Crystallizable Nitrate. Per Cent.	Recrystallized Nitrate.	Melting Point.
<i>Pil. spicatus</i> . . . .	.16	—	{ .03 .04	151.5° 130.5°
<i>Pil. trachylophus</i> .	.40	.02	{ — —	— —
<i>Pil. jaborandi</i> . . .	.72	.67 (161° m. p.)	{ .37 .30	162.7° 158.3°
<i>Pil. microphyllus</i> .	.84	.45 (160° m. p.)	{ .23 .22	162.7° 147.7°

From these results it is apparent that, while the several kinds of *jaborandi* leaves met with in commerce differ considerably in the amount of alkaloid they contain, the product obtained is probably always a mixture of two or more distinct alkaloids. The question whether the alkaloids hitherto described are natural constituents of the leaves or products of the alteration of pilocarpine, cannot at present be answered. According to Harnack<sup>1</sup> and Merck, *jaborandi*

<sup>1</sup> *Chem. Centralb.*, 1885, 628; *Jour. Chem. Soc.*, 1, 85; and *Pharm. Jour.* (3), 16, 106.

leaves yield four bases—pilocarpine, pilocarpidine, jaborine and jaboridine, the two latter being formed respectively from the two former. Hardy and Calmels,<sup>1</sup> on the contrary, consider that pilocarpidine is not a natural constituent of the leaves, but a product of the alteration of pilocarpine, effected in the extraction, while they question the existence of jaboridine. But the definition of all these bases is defective. The pilocarpidine of Harnack is said to form a finely crystallizable nitrate, but Hardy and Calmels state that the pilocarpidine produced by them from pilocarpine gives "basic salts that exactly resemble those of pilocarpine," but are "gummy." Additional uncertainty has been produced by inaccuracy in the published abstracts of original memoirs; thus, for instance, the abstract of Hardy and Calmels' paper in the *Journal of the Chemical Society*<sup>2</sup> states that nitric acid "has no action on pilocarpine," whereas, the original says that it has only the effect of converting it into pilocarpidine.<sup>3</sup>

In order to ascertain whether the differences of melting point observed in the nitrate obtained by recrystallization, as well as in commercial samples of the salt, were due to alteration of pilocarpine, we submitted several portions to the action of heat, which is stated to have the effect of converting pilocarpine into jaborine, and also into pilocarpidine. In operating upon the salt described as "pure pilocarpine nitrate," and melting at  $141.7^{\circ}$  C., we found that, after being heated in solution for fourteen hours in contact with air, there was a reduction of the melting point to  $133^{\circ}$ . The salt was still crystalline, and, on recrystallization from alcohol, it was separated into two portions: one, crystalline, amounting to 80 per cent. of the original quantity, melted at  $138.2^{\circ}$ , while the other was gummy, and contained a base insoluble in water. Evidently the alteration in this case was only partial.

Another portion of the same salt was recrystallized from alcohol in fractions, but without any considerable alteration in the original melting point being effected, as in the case of nitrate obtained from the samples of jaborandi leaves in the experiments above described.

In connection with the high melting point of one of the samples of commercial nitrate, for which we are indebted to the kindness of Mr. Martindale, it is of interest to mention that, when administered

<sup>1</sup> *Compt. Rend.*, 102, 1116.

<sup>2</sup> *Jour. Chem. Soc.*, 50, 900.

<sup>3</sup> *Compt. Rend.*, 102, 1562.

by injection of 8 drops of a 3 per cent. solution, it produced the unusual effects of intense desire to micturate, with strangury and subsequent vomiting. According to the account furnished by Dr. Owen Lankester to Mr. Martindale, this occurred on three separate occasions, while the solution of another sample of the salt simply produced the sweating characteristic of jaborandi.

We hope to be able to follow up this inquiry, and, by operating upon larger quantities of definitely authenticated material, to obtain some better knowledge of the bases obtainable from jaborandi, as well as means of distinguishing those of which little more than their names can be learned from published accounts.

---

### A SPURIOUS MARANHAM JABORANDI.<sup>1</sup>

BY E. M. HOLMES.

Genuine jaborandi, *Pilocarpus jaborandi*, has for some months past been a scarce article in commerce. The small leaves of the Maranham jaborandi, *Pilocarpus microphyllus*, have, however, been procurable, and have met with a ready sale to buyers for Germany, presumably for the preparation of pilocarpine, of which they contain a good percentage. Some of the more recent importations of these leaves have contained a few bales of leaves almost indistinguishable from them to the eye of a casual observer, but differing entirely in the absence of oil cells from their tissue. Some of these have already passed into commerce, and attention has probably been directed to them by their not yielding pilocarpine.

From samples sent me by Messrs. Wright, Layman and Umney, and Messrs. W. J. Bragg & Co., of Liverpool, and from fragments of flowers and fruit which Mr. J. O. Braithwaite kindly selected from a quantity of the leaves, I have been able to identify the family and genus to which the plant yielding them belongs.

For practical purposes the leaves, or, more properly, leaflets, may be recognized by the absence of oil cells, by their reticulated venation (the veinlets being usually pellucid), by not tapering to a narrow base, and by the very short hairy petiolule, about 1 mm. long. The upper surface is glossy, of a brownish-green tint, not grayish-green, as in *P. microphyllus*, and the midrib, on the upper surface, is minutely hairy, and the lateral veins form a more acute angle with

---

<sup>1</sup> *Pharm. Jour.* (4), 3, 2 (July 4, 1896).

the midrib. Usually there are small rounded or oval leaflets, about  $\frac{1}{2}$  cm. long, mixed with the larger leaflets, which average  $2\frac{1}{2}$  to 3 cm. long; these are never present in the true Maranham jaborandi. The presence of these small leaflets should, therefore, at once serve to the unaided eye as a guide to the presence of the spurious drug.

So far as I have been able to ascertain, the plant yielding the leaflets is hitherto undescribed, and it may, therefore, be useful to record the details at present obtainable. The leaves (*a*) are erectopatent, alternate with the rachis, which is covered with minute, incurved, ferruginous hairs, imparipinnate, with four or rarely five pairs of alternate leaflets, which are small and rounded in the lowest pair, becoming gradually larger towards the terminal leaf, which is largest, reaching 7 (or more) cm. long by  $1\frac{1}{2}$  cm. broad (*b*). The leaflets vary in shape from orbicular to ovate, elliptical or rhomboidal-lanceolate; they are emarginate, glossy and brownish-green above, with the midrib hairy, especially towards the base, paler and glabrous beneath, and are furnished with a short petiolule, 1 mm. long. The surface is minutely reticulated with pellucid veinlets. In some leaflets, however, the veinlets are opaque, partly or wholly. The centre of each areola is paler and semi-translucent. The leaves of the young shoots are comparatively thin.

The leaflets have usually all the network of the veins translucent, and the centre of the areolæ between the veinlets is paler than the margin next to them. From this appearance of the veinlets, I was at first led to suppose that the leaves belonged to some anacardiaceous plant, especially as the fruit appeared to be one-seeded. The examination of the young ovary, however, at once showed that with ten ovules it could not belong to that natural order. The translucency of the veins is, however, due to quite another cause than the secretory cells characteristic of the veins in that natural order. Prof. Greenish was kind enough to cut some sections of the leaf for me, and these showed that palisade cells were absent over the veins, and that the small cells which replace them are free from chlorophyll. The paler, semi-translucent appearance of the centre of the areolæ is apparently due to hollow spaces in the spongy parenchyma, the cells of which contain but little chlorophyll.

Only two imperfect flowers were met with (*c*), and in these the calyx was torn; only five stamens were present and a portion of a petal. It was, however, possible to determine that the calyx was

membranaceous; the ovary sessile, densely hairy, furnished with a style equalling it in length, with a capitate stigma, and containing ten oblong ovules in two rows. The halves of a hairy pericarp (*d*) found with the leaves showed that the fruit is one-celled, oblique, inflated, about 1 cm. long and 7 mm. broad, with a partially separable endocarp, attached to a slender, glabrous pedicel, 1½ cm.



SPURIOUS MARANHAM JABORANDI.

*a*, young twig, leaflets two-thirds natural size; *b*, terminal leaflet showing portion of reticulated venation; *c*, imperfect flower, showing ovary and style; *d*, pericarp one-half natural size; *e*, young fruit, with pedicel.

long (*e*). On showing the flowers to Mr. W. B. Hemsley, at the Kew Herbarium, he suggested that they might belong to the genus *Sweetia*, in Leguminosæ. On comparing the leaves of that genus I found that they did not correspond with those of the drug, nor were the fruits like the half pericarps I had. On looking through the allied genus *Swartzia*, however, I found that there were three spe-



cies with very similar leaves and two which had very similar pods. These are *S. pilulifera*, Benth.; *S. mollis*, Benth.; and *S. Matthewsii*, Benth.

*S. pilulifera* differs in having only two pairs of opposite leaflets, a very short, inflexed style and a stalked ovary.

*S. mollis* differs in its very hairy leaflets and glabrous ovary, as figured in *Ann. Sc. Nat.* (2), 20, t. 4.

*S. Matthewsii* differs in its semi-lunate pod, and in the pedicel of the fruit being only two to three lines long and the ovary containing only two to three ovules.

The false *Maranham jaborandi*, therefore, probably belongs to an undescribed species, characterized by its leaves having four pairs of leaflets, with a terminal one; the leaflets having strongly reticulated venation, an emarginate apex, and being alternately arranged on the rachis; by the hairy ovule containing ten ovules, the slender style as long as the ovary, the capitate stigma, and the short, inflated pod, about 1 cm. long, sessile on a slender pedicel, 1½ cm. long. Until further specimens are procurable, from which it might be determined if only one petal and five stamens are present, the plant might be provisionally named *Swartzia decipiens*.

---

## RECENT CONTRIBUTIONS TO PHARMACY.

### A NEW REAGENT FOR ALKALOIDS.

Sodium vanadate has been suggested by Jaworowski (*Phar. Zeit. für Russland*, 35, 326) as a reagent for alkaloids in acetic acid solution. The addition of a salt of copper to the reagent increases its delicacy. 0.3 gramme each of sodium vanadate and copper sulphate are dissolved separately in 10 c.c. of water, and, after cooling, the two solutions are mixed. Acetic acid is then dropped in until the precipitate of copper vanadate is dissolved; usually not more than 7 or 8 drops of the acid are necessary. The slightly cloudy solution is filtered, and then it is ready for use, which is as follows: the alkaloid, if existing as a salt, is dissolved in 4 or 5 c.c. of water, or, if free, a little acetic acid is used, and heat if necessary. After cooling, one drop of the reagent is added, and if no precipitate forms after fifteen minutes, the solution is divided into two portions; to one, another drop of the reagent is added; the other portion is

heated to the boiling point. A precipitate or opalescence will be obtained in one of the three cases.

The author divides the alkaloids into three groups, according to the concentration required for them to produce a precipitate.

The first group includes such alkaloids as are precipitated when existing in solution of a strength of 0.01 to 0.001 per cent. The second group require a concentration of 0.1 per cent. The third group are either not precipitated or only from concentrated solution.

In the first group are placed thebaine, berberine, nicotine, aconitine, strychnine, quinine and the other cinchonic alkaloids, brucine, emetine and apomorphine; in the second group, morphine, sparteine, papaverine, atropine, narcotine, codeine, cocaine and hyoscyne; in the third group, caffeine, colchicine, coniine, cotoine, narceine, pilocarpine, piperine, solanine, theobromine and veratrine.

#### THE FUNCTION OF CALCIUM IN PLANTS.

The *Pharmaceutical Journal* for June 20, 1896, summarizes the recent work on this subject as follows: In 1875, J. Boehm arrived at the conclusion that one of the functions of calcium in plants is to aid in the conduction of carbohydrates. Subsequently, A. F. W. Schimper showed that oxalic acid is a by-product in the building up of proteids in plants which normally contain crystals of calcium oxalate, and that, in the absence of calcium, acid potassium oxalate accumulates in the leaves and buds and acts as a poison. He concluded, therefore, that the use of calcium is to combine with and neutralize this poisonous salt. Sugar, however, was proved to travel in leaves containing no appreciable amount of calcium, and carbohydrates were found sometimes from the seeds up the stem of the seedling, without any corresponding emigration of calcium. P. Groom (*Annals of Botany*) now suggests that acid potassium oxalate retards the action of diastase on starch, and that the first effect of the salt on the assimilating tissues is the accumulation of starch, owing to an arrest in the change of the carbohydrate into sugar. The second effect, as the soluble oxalate accumulates, is the retardation of the manufacture of starch, and hence, probably, of the assimilation of carbon; whilst the last effect is the death of the protoplasm. Groom's researches, therefore, confirm Schimper's discovery—that the evil effects of a lack of calcium are to be attributed

to the accumulation of acid potassium oxalate in plants which normally contain calcium oxalate. They may also be regarded as complementary, in showing that in the absence of calcium there is a stoppage in the conduction of those carbohydrates only which have entered into the condition of starch. Part of the carbon assimilated by plants never enters into the starch condition, and it is clear, therefore, why growth is not at once arrested in shoots or seedlings deprived of calcium.

ON THE PRESENCE IN MONOTROPA HYPOPITYS OF A GLUCOSIDE OF METHYL SALICYLATE AND OF A SOLUBLE FERMENT.

Em. Bourquelot (*Jour. de Pharm. et de Chim.*, (6) 3, 577) has investigated the glucoside of methyl salicylate in *Monotropa hypopitys*, and the soluble ferment, which is capable of decomposing this glucoside. The same author has already (*Jour. de Pharm. et de Chim.*, (5), 30, 96, 188 and 433) pointed out the presence of methyl salicylate in several species of *Polygala* and in *Monotropa hypopitys*. His observations have led him to believe that methyl salicylate does not pre-exist in the plant, but that it is formed, when the latter is crushed, by the action of a soluble ferment on a glucoside of this particular ether, and that, during the life of the plant, the ferment and the glucoside are located in different cells.

The glucoside is first separated from the plant by cutting (or breaking, in the case of *Monotropa*) the plant in contact with 95° alcohol, previously heated to the boiling point. The alcohol is recovered by distillation, and the syrupy residue dissolved in alcohol and treated with neutral lead acetate. The mixture is filtered, and the filtrate, which contains the glucoside, is treated with hydrogen sulphide to remove lead. After removal of lead sulphide by filtration, the solution is concentrated and precipitated with ether. The amorphous mass is the impure glucoside, which may be purified by a repetition of the process, but the compound has not yet been obtained in the crystalline state. Its aqueous solution deviates a ray of polarized light to the left. The author considers it to be a glucoside of methyl salicylate, because the odor of the latter is developed when this glucoside is heated with a 2 per cent. solution of sulphuric acid, and when this cooled liquid is agitated with ether, the ethereal solution separated and evaporated, the residue yields a violet coloration with solution of ferric chloride.

The ferment in *Monotropa* is extracted by rubbing the fresh plant with clean, dry sand, and at once throwing into strong alcohol. After a half-hour's standing the mixture is filtered, washed with alcohol and then with ether. The residual powder contains the ferment mixed with sand. When this powder is added to some of the solution containing the glucoside of methyl salicylate the odor of methyl salicylate is developed. A ferment also exists, as shown by the author, in at least two species of *Polygala*, and when this ferment is added to the glucoside from *Monotropa*, the odor of methyl salicylate is developed. The following plants also contain the ferment as found by the author, and in confirmation of the results of Procter<sup>1</sup> and Schneegans and Gerock:<sup>2</sup>

*Gaultheria procumbens*, *Betula lenta*, *Polygala senega* and *Spiræa ulmaria*.

#### GLYCEROPHOSPHORIC ACID AND GLYCEROPHOSPHATES.

Delage and Gaillard (*Nouveaux Remèdes*, 1896, p. 217) have devised a shorter method of preparing these compounds than that previously published by Portes and Prunier (*AM. JOUR. PHARM.*, 1894, p. 383). According to the new process, 1 part of 60 per cent. phosphoric acid is mixed in a glass flask with  $1\frac{1}{2}$  parts of glycerin, whereby the temperature is raised from an initial temperature of  $15^{\circ}$  to  $25^{\circ}$ . The flask is then fitted with a thermometer and a tube for the escape of gases; heat is then applied so as to raise the temperature of the mixture gradually. At  $120^{\circ}$  it begins to boil and becomes pale yellow; at  $160^{\circ}$  it is dark yellow, and at  $190^{\circ}$  it is brown, has a syrupy consistence, and gives off the vapors of acrolein. In forty minutes it is possible to combine a mixture of 100 grammes of phosphoric acid and 150 grammes of glycerin. When the mixture is cooled a viscous mass is obtained. The product is treated with 30 grammes of a mixture obtained by stirring 50 grammes of calcium carbonate into 250 c.c. of water. The mixture is agitated and allowed to stand six hours, or until effervescence ceases, when it is filtered. The resulting limpid liquid is treated with half its volume of 90 per cent. alcohol, whereupon the calcium glycerophosphate is precipitated in flocks. This precipitate is collected on a filter, washed with alcohol, dissolved in water, and the glycerophos-

<sup>1</sup> *AM. JOUR. PHARMACY*, 1844, p. 241.

<sup>2</sup> *Archiv der Pharmacie*, 1894, p. 437 and *AM. JOUR. PHARMACY*, 1895, p. 14.

phate again precipitated with alcohol. The precipitate is collected and dried at as low a temperature as possible, over lime or sulphuric acid.

The resulting powder has an amorphous appearance, but is found under the microscope to be crystalline. The yield from the foregoing quantities was found to be 6 grammes. The portion not precipitated by alcohol yields, on evaporation, a gelatinous mass containing calcium glycerophosphate not precipitated by alcohol, but precipitated on the application of heat.

The glycerophosphates of sodium and potassium have only been obtained in solution. Those of magnesium, lithium, strontium, ferrous and ferric iron have been prepared.

The author gives the following formulas for the administration of glycerophosphates:

Calcium glycerophosphate . . . . .	6 grammes.
Sodium " . . . . .	} each . . . . . 2 "
Potassium " . . . . .	
Magnesium " . . . . .	
Ferrous " . . . . .	
Tincture of St. Ignatius' bean . . . . .	30 drops.
Pepsin . . . . .	3 grammes.
Diastase . . . . .	1 "
Tincture of kola . . . . .	10 "
Syrup of cherries . . . . .	200 "

Dose, a tablespoonful.

Calcium glycerophosphate . . . . .	0.30 gramme.
Magnesium " . . . . .	0.10 "
Ferrous " . . . . .	0.05 "
Powdered St. Ignatius' bean . . . . .	0.03 "
Pepsin . . . . .	0.15 "
Diastase . . . . .	0.05 "

For one cachet.

Ferrous glycerophosphate . . . . .	0.05 to 0.10 gramme.
Powdered rhubarb . . . . .	0.05 "
Extract of cinchona . . . . .	0.15 "

For one pill.



## EDITORIAL.

### THE ELECTROLYTIC PRODUCTION OF ALKALI AND BLEACHING POWDER.

The problem of the production of chlorine and caustic soda by the electrolysis of the alkaline chlorides has occupied the attention of many experimenters during the past ten years, and what at first looked to be a practical impossibility has now become a commercial success.

Two great difficulties had to be overcome before this success could be obtained. It is well known that when anodes and cathodes are placed opposite each other in a solution of sodium chloride, but without being separated by a porous diaphragm, the electric current gives rise to the formation of hypochlorite of sodium. If, on the other hand, you place porous diaphragms between the positive and negative plates in such a way as to form water-tight compartments, chlorine will be generated in all the positive compartments, and caustic soda in all the negative ones. Again, both the chlorine and the oxygen, as evolved, have a powerful disintegrating action on ordinary carbons; so that a form of carbon had to be sought that would be capable of resisting the action of these elements for a lengthy period. Gas carbon, specially prepared and highly heated, so as to obtain a maximum density, was finally found to work best. The difficulty with the diaphragm was a much more persistent one, and has not been entirely overcome. We have, however, at the present moment three promising industrial processes for the electrolysis of salt solution, which claim to have substantially overcome the difficulties just noted, and a brief account of these, abridged from the *Engineering and Mining Journal*, of June 13 and 20, 1896, may be of interest to our readers.

The first of these is the Richardson-Holland process, which is worked by the Electro-Chemical Company, at Parr, near Widnes, in Lancashire, England. In this process, instead of porous partitions, use is made of one non-porous partition which does not quite reach to the bottom of the tank, so that the solutions in the two compartments are not separated from each other at the bottom of the electrolyzer. In the electrolyzing tanks, the solution of soda attains a maximum density of 14 per cent., but is not wholly free from chlorine, which means that there is some loss of soda, as well as chlorine, due to formation of hypochlorite.

The plant erected promises to turn out 6,400 tons of caustic soda (of 70 per cent. strength) and 13,320 tons of bleaching powder per annum, and the entire production for the current year (1896) has been sold in advance.

The Castner process differs very materially from that just described, and seems to be in all respects superior to it. In this case the diaphragm consists simply of a layer of mercury, which constantly oscillates in a compartment closed on each side by a non-porous partition, the lower end of which just reaches the layer of mercury. No resistance is offered by this diaphragm, which automatically (in consequence of a slow rocking of the tank) leans first towards the cathode and then towards the anode, and which, in coming alternately in contact, first with one and then with the other, absorbs the sodium liberated, and then at once gives it up to the water which is over the mercury. There seems to be an entire absence of hypochlorite formation, and the solutions of caustic soda formed in the cathode compartments have a density of 20 per cent., and yield, on evaporation, solid caustic soda of 78 per cent. strength

—a product which has not, up to the present, been heard of in the alkali industry.

The installation of the English Castner-Kellner Alkali Company is to be of 4,000 horse-power, and will turn out 6,300 tons of pure caustic soda, and 13,600 tons of bleaching powder per year. In this country the Mathieson Alkali Company is erecting a plant of 2,000 horse-power at Niagara Falls, to work the Castner patents.

The third process referred to is that of Jas. Hargreaves, in which a porous diaphragm is used on either side of the positive compartment, within which the electrolyte is placed, while the negative compartments to either side are empty at first. When the current passes, chlorine is evolved in the positive compartment, while caustic soda oozes through the diaphragm to either side, and is swept off the outside of the same by a current of steam, and rapidly converted into carbonate of soda.

The experiments made at the works of the General Electrolytic Company, at Farnsworth, near Widnes, in Lancashire, show that, with 2,000 horse-power, 5,830 pounds of sodium chloride will be decomposed daily, and that the products of the electrolysis will be  $26\frac{1}{4}$  tons of bleaching powder and 15 tons of sodium carbonate. The cost by this process seems to be less than that by either of the two before mentioned.

The one thing which seems abundantly demonstrated is that the manufacture of caustic alkali and bleaching powder is no longer dependent upon the time-honored Leblanc process, which seems destined to give way, in the near future, to simpler methods, which at the same time yield purer products.

S. P. S.

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

YEARBOOK OF THE UNITED STATES DEPARTMENT OF AGRICULTURE, 1895. Washington : Government Printing Office, 1896. Pp. 616.

Over 500 pages of the book are devoted to original articles, most of which contain a fund of practical information, the value of which is not limited to the agriculturists for whom they were prepared. Among the thirty original papers, we especially note the following :—"Soil Ferments Important in Agriculture," by H. W. Wiley ; "Frosts and Freezes as Affecting Cultivated Plants," by B. T. Galloway ; "Oil-Producing Seeds," by G. H. Hicks ; "Some Additions to Our Vegetable Dietary," by F. V. Coville ; "The Pineapple Industry in the United States," by H. J. Webber ; "The Relations of Forests to Farms," by B. E. Fernow ; "Inefficiency of Milk Separators in Removing Bacteria," by V. A. Moore. A number of these contributions are handsomely illustrated. The paper on oil-producing seeds is of special interest to pharmacists, because of its completeness on the sources of fixed oils and statistics concerning them.

UEBER EINIGE NEUE ABKÖMMLINGE DES TERPINEOLS. Von Henry V. Arny. Inaugural Dissertation for the Degree of Doctor in Philosophy. Göttingen. 1896.

The author reached the following conclusions as the result of his investigation :

(1) Terpeneol gives, with both primary and secondary amines of the fatty and aromatic series, well-characterized nitrolamines.

(2) Terpeneolnitrosochloride, by the action of zinc dust and glacial acetic acid, is reconverted into terpeneol.

(3) Terpeneolnitrosochloride gives, on treatment with sodium alcoholate, an oxyoxim,  $C_{10}H_{15}OHNOH$ .

(4) This oxyoxim is convertible, by dilute sulphuric acid, directly into carvon.

(5) Through this conversion is the near relation of terpeneol to the carvon series established.

(6) The oxyoxim gives as carvoxim, with concentrated sulphuric acid, para-amidothymol.

TRANSACTIONS OF THE ACADEMY OF SCIENCE OF ST. LOUIS. Vol. VIII, No. 6. Flowers and insects. By Charles Robertson. Contributions to an account of the ecological relations of the entomophilous flora and the anthophilous insect fauna of the neighborhood of Carlinville, Ill.

UEBER EINIGE JAPANISCHE NAHRUNGSMITTEL. Von Dr. Oscar Loew. Tokyo, Japan. 1896.

In the list of Japanese foods given are a number which are well known in this country, but which have not been thought of in connection with the subject of food, viz.: *Lilium auratum* and *L. tigrinum*, *Pteris aquilina*, *Osmunda regalis*, and *Equisetum arvense*, all of which, no doubt, are employed for their mucilage.

SUR UNE METHODE DE SEPARATION DES METHYLAMINES PAR L'ALDEHYDE FORMIQUE. Par Stéphane Marcl Delépine. Thesis for diploma of pharmacist of the first-class. Paris: Gauthier-Villars et Fils. 1896.

ORGANISMES DES HYDROLATS ET DES SOLUTES. Par Henri Barnouvin. Thesis for diploma superior of pharmacist of the first-class. Paris. Société d'Editions Scientifiques. 1896.

This is a valuable contribution to the knowledge of the various growths which occur in many solutions, especially in those of the alkaloids.

KEIL'S MEDICAL, PHARMACEUTICAL AND DENTAL REGISTER-DIRECTORY AND INTELLIGENCER. Fourth edition. George Keil, editor. Philadelphia: Burk & McFetridge. 1896.

The fourth edition of Keil's Directory contains a list of the physicians, dentists and pharmacists in the States of Pennsylvania, New York, New Jersey, Maryland, Delaware and the District of Columbia. There is also much useful information concerning colleges, hospitals, dispensaries, societies, laws, etc.

LASHER'S DIRECTORY OF THE WHOLESALE GROCERS AND CANNERS AND PACKERS OF THE UNITED STATES AND CANADA. Fourth edition. Philadelphia: George F. Lasher. 1896.

FLORA OF WEST VIRGINIA. By Charles Frederick Millspaugh and Lawrence William Nuttall. Field Columbian Museum. Publication 9, Botanical Series. Vol. I, No. 2. Chicago. 1896. Illustrated.

ON SUNDRY COLLECTIONS OF MAMMALS. By D. G. Elliot. Field Columbian Museum. Publication 11, Zoological Series. Vol. I, No. 3. Chicago, May, 1896. Illustrated.

THE PRINCIPAL DISEASES OF CITROUS FRUITS IN FLORIDA. By Walter T. Swingle and Herbert J. Webber. U. S. Department of Agriculture. Bulletin No. 8. Washington. 1896. Illustrated.

THE *St. Louis Chronicle's* PHOTOGRAPHIC VIEWS OF THE GREAT CYCLONE AT ST. LOUIS. May 27, 1896. From Meyer Brothers' Druggist.

MASSACHUSETTS COLLEGE OF PHARMACY. Thirtieth Annual Catalogue. 1896-97. Boston, Mass.

CATALOGUE OF THE UNIVERSITY OF PENNSYLVANIA, FACICULUS OF THE DEPARTMENT OF MEDICINE. 1896-97. Philadelphia, Pa.

NORTHWESTERN SCHOOL OF PHARMACY. CIRCULAR OF INFORMATION FOR 1896-97. Chicago, Ill.

ANNUAL ANNOUNCEMENT OF THE ONTARIO COLLEGE OF PHARMACY. Seventeenth session. 1896-97. Toronto, Ont.

ALBANY COLLEGE OF PHARMACY. ANNUAL CATALOGUE, 1896-97. Albany, N. Y.

## PHARMACEUTICAL ASSOCIATIONS.

### AMERICAN PHARMACEUTICAL ASSOCIATION.

The forty-fourth annual meeting will be held at Montreal, Canada, beginning Wednesday, August 12, 1896, at 2.30 o'clock P.M. The first session of the Council will be held on the same date, at 10 o'clock A.M.

Credentials of delegates should reach the permanent secretary at his office not later than August 4th; after that date they should be sent in care of the local secretary.

Propositions for membership may be sent to the secretary of the committee, Geo. W. Kennedy, Pottsville, Pa., up to August 7th, after which date they should be sent to him at the Windsor Hotel, Montreal.

Essays and papers to be read at the meeting should be forwarded without delay to the chairmen of the respective sections, viz.: Education and Legislation, Prof. C. S. N. Hallberg, Chicago, Ill.; Scientific Papers, Prof. S. P. Sadtler, Philadelphia, Pa.; Commercial Interests, Geo. J. Seabury, Esq., New York, N. Y. Papers received after July 20th cannot be printed in time for the meeting.

The Committee of Arrangements have issued a circular of information, a copy of which has been mailed to every member. Headquarters of the Association will be at the Windsor Hotel. Quarters may be secured in advance by addressing the local secretary, Joseph E. Morrison, 43 Church Street, Montreal, Canada; in order to avoid a rush and a confusion, early application should be made for same.

The Chairman of the Committee on Transportation has furnished the following information, which will, no doubt, be supplemented by individual circulars for the different sections: All the railroads of the Trunk Line, Central, Western and Southern Passenger Associations, have agreed to furnish a rate of  $1\frac{1}{3}$  fare on the certificate plan. In purchasing a ticket, a certificate, properly signed by the agent, must be secured, upon presentation of which to the ticket agent at Montreal, after countersignature by the permanent secretary, a return ticket will be issued at one-third fare. Tickets to Montreal must be purchased between August 9th and 15th, and return tickets within three days after final adjournment of the meeting.

The New England delegation will leave Boston on Monday, August 10th, at 9.40 A.M., by Boston and Maine Railroad, reaching the Crawford House at 3.20 P.M. Here the party will remain until Tuesday, at 12.35 P.M., thus giving an opportunity of enjoying White Mountain scenery. Arrive in Montreal at 8.30 P.M.

The New York, Pennsylvania and Southeastern delegations will leave New York by the Delaware and Hudson River Railroad, on Tuesday morning, August 11th, passing through the Adirondacks and reaching Montreal the same evening.

The Western delegations will meet at Chicago and leave there by the Wabash Railroad, on Sunday afternoon, August 9th, for Toronto, Canada, where one of the Richelieu and Ontario Navigation Company's steamers will be taken, and the rest of the trip made by boat to Montreal, arriving about 8 P.M. on Tuesday.

Special information, if desired, may be obtained from the members of the committee: Joseph E. Morrison, Montreal, Canada, chairman; Albert E. Ebert, Chicago, Ill.; Sam'l A. D. Sheppard, Boston, Mass.; Chas. M. Ford, Denver, Col.; Harry Sharp, Atlanta, Ga.; Wm. J. M. Gordon, Cincinnati, O.; Henry M. Whelpley, St. Louis, Mo.; C. A. Mayo, New York, N. Y.; Louis F. Chalin, New Orleans, La.; Wm. M. Seaby, San Francisco, Cal.; Karl Simmon, St. Paul, Minn.

CHAS. CASPARI, JR.,  
*Permanent Secretary.*

The following provisional programme has been arranged:

All business meetings are to be held in the Ordinary of the Windsor Hotel; local secretary's office, room No. 2, same building.

*Wednesday, August 12th.*

9.30 A.M.—Council Meeting.

2.30 P.M.—First General Session.

9.00 P.M.—Reception tendered by the Pharmaceutical Association of the Province of Quebec, and the Montreal College of Pharmacy, in the parlors of the Windsor Hotel.

*Thursday, August 13th.*

10.00 A.M.—Second General Session.

3.00 P.M.—Section on Commercial Interests.

8.30 P.M.—Section on Commercial Interests.



*Friday, August 14th.*

10.00 A.M.—Section on Scientific Papers.

3.00 P.M.—Electric Car Ride through the City, Outremont, Cote des Neiges, etc.

8.30 P.M.—Section on Scientific Papers.

*Saturday, August 15th.*

10.00 A.M.—Section on Scientific Papers.

3.00 P.M.—Section on Pharmaceutical Education and Legislation.

8.30 P.M.—Section on Pharmaceutical Education and Legislation.

*Sunday, August 16th.*

Devoted to rest.

*Monday, August 17th.*

9.30 A.M.—Trip through the Lachine Canal, Lake St. Louis and Lachine Rapids, descending the River St. Lawrence to Boucherville and Vercheres.

*Tuesday, August 18th.*

10.00 A.M.—Section on Pharmaceutical Education and Legislation.

8.30 P.M.—Concert in the Windsor Hall.

*August 19th to August 26th.*

To be arranged by Council.

J. E. MORRISON, *Local Secretary*,  
43 Church Street, Montreal.

## KENTUCKY PHARMACEUTICAL ASSOCIATION.

The nineteenth meeting of the Kentucky Pharmaceutical Association was held at Estill Springs, Irvine, Ky., June 16th-19th, inclusive. The meeting was eminently successful in every way. Some seventy-five members, many with their wives, were present; all actively participated in all the exercises.

Eighteen new members were elected.

The Legislative Committee was instructed to draft an entirely new pharmacy law, to be presented to the next annual meeting for ratification. It was the general impression that it would be no more difficult to pass an entirely new law than to pass the needed amendments to the old one.

The "Atchison Plan," as presented by the Kansas Pharmaceutical Association at its last annual meeting, was brought before the Association, and the protests against the sale of those patent medicines and proprietary articles which do not yield the retailer a gross profit of at least 50 per cent. were heartily concurred in.

Prof. G. L. Curry's paper, "Bacteriology for the Pharmacist," was awarded the association prize of \$10 as the best scientific paper, and the paper entitled "The Retail Pharmacist," by the same author, was awarded a similar prize as the best commercial paper.

The action taken at the last annual meeting, making the Directors and Faculty of the Louisville College of Pharmacy ineligible for membership on the State Board of Pharmacy, was, after a spirited discussion, rescinded.

The following officers were elected for the ensuing year :

President—R. M. McFarland, Henderson.

First Vice-President—J. C. Hearne, Lexington.

Second Vice-President—C. F. Keener, Newport.

Third Vice-President—Dr. J. S. Leech, Glasgow.

Secretary—J. W. Gayle, Frankfort.

Treasurer—Chas. G. Morrise, Twenty-eighth and Dumesnil Streets, Louisville.

Local Secretary—A. R. Johnson, Henderson.

Chairman Executive Committee—C. Troxler, Jr., Third and Breckinbridge Streets, Louisville.

Place of next meeting will be either Cerulian Springs or Crittenden Springs—to be decided by the Executive Committee.

---

## MEETING OF THE PHILADELPHIA COLLEGE OF PHARMACY.

PHILADELPHIA, June 29, 1896.

The stated meeting of the members of the College was held this day at 4 o'clock P.M., Wm. J. Jenks, presiding. Minutes of last stated meeting were read, as also the record of proceedings of the Board of Trustees for April, May and June, which minutes were adopted and approved, respectively. Thirteen members were present. The Chairman of the Delegates to the Sessions of the Pennsylvania Pharmaceutical Association, held at Holly Inn, Cumberland County, Mr. Wm. McIntyre, not being ready with report, Dr. C. B. Lowe gave a verbal account. Dr. Lowe also proposed that the office of the Actuary in the College should be closed during the months of June (hereafter), July and August at 5 o'clock P.M., and offered a resolution to that effect, which was subsequently amended by Prof. Trimble, by motion, to refer the subject to the Committee on Property. Amendment to original motion accepted and adopted, the Secretary being requested to refer the matter to Committee on Property, in a written communication.

The Chairman designated Prof. Henry Trimble, Prof. Jos. P. Remington and J. C. Peacock as delegates to represent this College at the coming meeting of the American Pharmaceutical Association, to be held at Montreal, August 12th. Mr. J. A. Heintzelman presented, as an illustration of trade ways that are dark but tricks that are vain, a lump of gum or crude opium, in the centre of which was deftly imbedded a spherical pebble of at least two-fifths of the weight of the whole mass. After some mild expressions of remonstrance, and charitable comment on the guileless character of the sinner who perpetrated the fraud, the meeting, on motion, adjourned.

WILLIAM B. THOMPSON,  
*Secretary.*

## NOTES AND NEWS.

*Dr. J. Norman Collie* has been appointed to the Chair of Chemistry in the School of the Pharmaceutical Society of Great Britain. He now holds the position of Assistant in the University College, London.

In his new position Dr. Collie will be required to take the places of both Professors Attfield and Dunstan.

*The Botanic Gardens of the World* is the subject of a serial article in the *Pharmaceutical Journal*, the first installment of which appeared in the issue of July 11th. The introductory points out the close relation that has always existed between botany and medicine, as illustrated by the fact that botanic gardens were originally devoted to the cultivation of those plants only from which particular remedies were derived.

We learn, through the *Pharmaceutical Journal* of July 18th, of the death of *Friedrich August Kekule*, at Bonn, on July 13th, at the age of sixty-seven. He was successively professor at Ghent and Bonn, and was the author of the well-known theory of the benzol ring, which may be said to have created a new era in organic chemistry. His most important work was his "*Lehrbuch der organischen Chemie*," in three volumes (1861-67).

The *Scientific American*, issued July 25th, is especially attractive in commemoration of its fiftieth anniversary. Many illustrated comparisons are made of the present time with half a century ago. The most noteworthy subjects treated are: "The Trans-Atlantic Steamship," "Naval and Coast Defence," "Railroads and Bridges," "The Sewing Machine," "Photography," "The Phonograph," "Telegraph," "Telephone," "Progress of Printing," "The Bicycle," and "Ocean Telegraphy."

*Professor John Attfield* was born in 1835, and is, therefore, nearly sixty-one years of age, instead of sixty-four, as we incorrectly stated in our last issue. In addition to our brief remarks concerning him at that time, we may add that he is sole editor of the forthcoming British Pharmacopœia, and it is his intention to give the work imperial extension of usefulness in the colonies and India. He has always advocated the use of the metric system of weights and measures, which, in Great Britain, as in the United States, is only legalized permissively, but which will soon receive important forward impulse by adoption into the British Pharmacopœia.

*Mr. J. H. Maiden*, former Curator of the Technological Museum, Sydney, New South Wales, has been appointed Director of the Botanic Gardens at that place. He succeeds Mr. Charles Moore, who, after nearly fifty years of service, has retired. Mr. Maiden has, for a number of years, been identified with the economic botany of Australia, and he has published a large number of papers on that subject.

Probably his most important work is a book of nearly 700 pages, on "*The Useful Native Plants of Australia*." He is at present engaged on an illustrated work entitled "*The Flowering Plants and Ferns of New South Wales*," which is appearing in parts.

m.

he  
ue

o-

he  
ue  
ys  
ic  
m

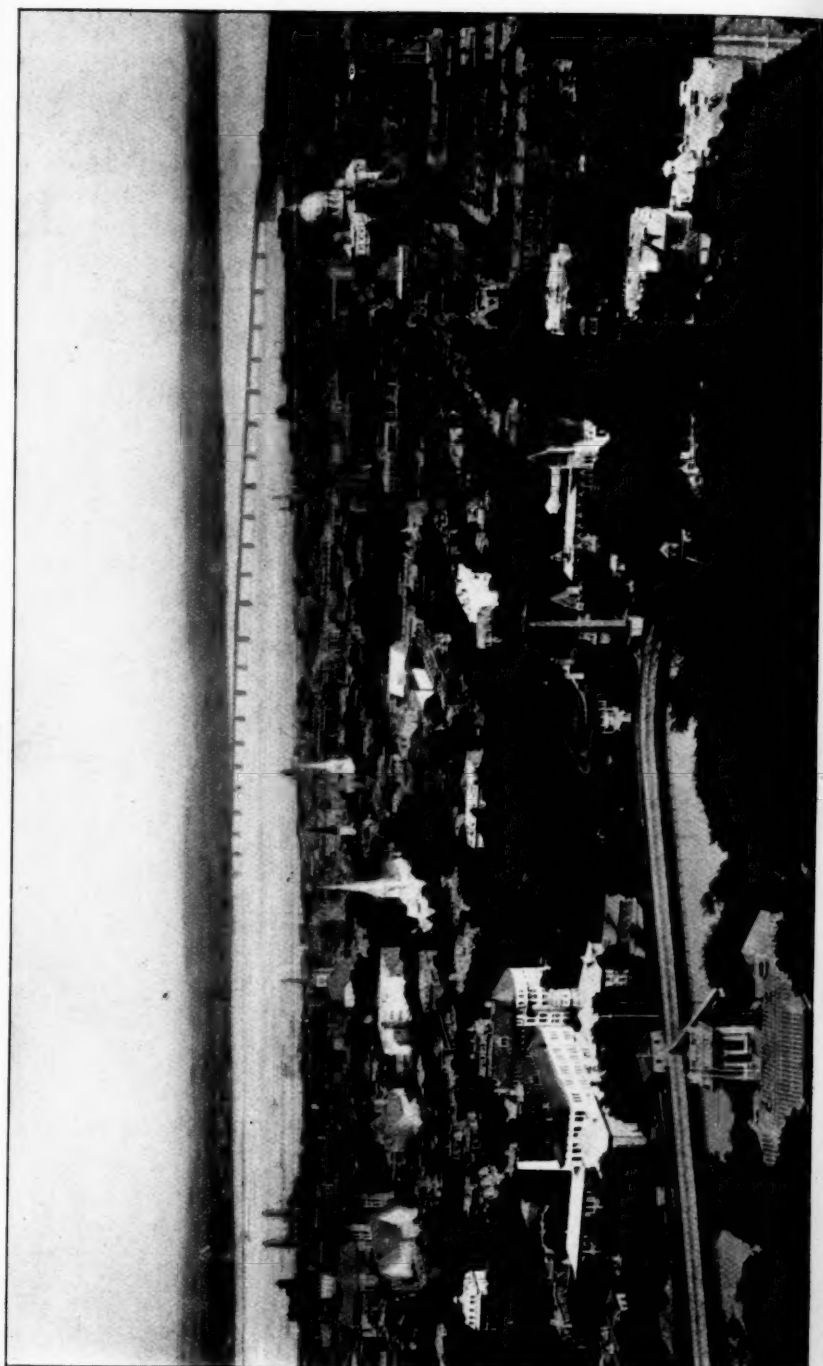
of  
n.  
he  
ew  
er

m-  
of  
ctis  
, "  
he  
he

me  
ie.  
at  
n-  
id  
nd  
er-  
on

y,  
at  
ce,  
ie  
ers

he  
ed  
ch



CITY OF MONTREAL FROM MOUNT ROYAL.

WI  
an  
bo  
has  
kn  
con  
At  
40  
exp  
tion  
pre  
pre  
bein  
mat  
and  
dist  
A  
sho  
bein  
1 p  
ciati